MACWORLD

December 1986 $3.95
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The Macintosh™ Magazine

Word Processors

Ten of the best

- Now! Play and Print Music with Your Mac
- The Next Generation's Program Tools—MPW
- Seasonal Wrap-Up: Exciting Games for the Mac
- Reviews of Clip-Art Collections—Over 100 Products

NEW!

Turbo Pascal for the Mac: incredibly fast and fully integrated!

Borland's new Turbo Pascal for the Mac™ is so incredibly fast that it can compile 1,420 lines of source code in the 7.1 seconds it took you to read this sentence.

And reading the rest of this page takes about 5 minutes, which is plenty of time for Turbo Pascal for the Mac to compile at least 60,000 lines of source code!

Turbo Pascal for the Mac does both Windows and "Units"

The *separate* compilation of routines offered by Turbo Pascal for the Mac creates modules called "Units"—which can be linked to any Turbo Pascal® program. This "modular pathway" gives you "pieces" which can then be integrated into larger programs. (You build the "pieces" once, and you know they work, so you can use them again without having to recompile.) The immediate benefits of this technique are a more efficient use of memory and a reduction in the memory space needed to run large programs. (What you need to run Turbo Pascal for the Mac is 256K minimum—or half a Fat Mac, 1 drive, and the ability to handle astonishing speed.)

> "The timing of Turbo Pascal for the Mac couldn't be better. The recent success of the Macintosh in business and its continuing momentum in higher education coincide well with the introduction of Turbo Pascal for the Mac. Turbo Pascal is already an industry standard in the IBM-compatible world, and we're very excited to see Borland International's new commitment to provide this and other modestly priced, high-quality software for the Macintosh computer."
>
> **John Sculley, Chairman, Apple Computer, Inc.**

> "Turbo Pascal has become the language of choice at major educational institutions around the country, and more than 400,000 copies of the IBM PC version have been sold. We believe that Turbo Pascal for the Mac is the ideal educational and professional programming tool for the Macintosh."
>
> **Philippe Kahn, President, Borland International**

Turbo Pascal for the Mac is so compatible with Lisa that they should be living together

Not just Lisa®, but also Macintosh Programmers' Workshop Pascal.™ Routines from either one can be compiled and run with only the subtlest changes. Turbo Pascal for the Mac is also compatible with the Hierarchical File System™ of the Macintosh.™ (You can define default volume and folder names for the names used in compiler directives.) Compatibility is also familiarity, and you'll feel right at home with Turbo Pascal for the Mac because it fits neatly into every aspect of the Macintosh environment. The pull-down menus are there, along with dialogue boxes to guide you in making choices and picking options.

Turbo Pascal for the Mac cranks out more than 12,000 lines a minute

Better than *12,000 lines per minute* of compiled source code race out of Turbo Pascal for the Mac. There is definitely "No Waiting." And none of the "stop/start" compiling delays that afflict some of the software programs that we're not mentioning here. (They can take 10 minutes to do what Turbo Pascal for the Mac can do in 10 seconds!)

You don't spend a lot of up-front time learning to use Turbo Pascal for the Mac. It's as *easy* as it is *fast*—which is not to say that it's over-simplified or written for people who have recently learned to walk erect. Instead, it's electronic proof that sophistication and complication don't need to go hand-in-hand.

In all software, there's the Hard Way, the Wrong Way, the Weird Way, the No Way, and the Borland Way. Welcome to the Borland Way!

How to walk and chew gum!

Turbo Pascal for the Mac lets you do up to *8 different things at once.* You can have up to 8 separate programs in memory, work on one, move on; work on another, move back—or duck and weave between all 8 at the same time! And you can do these 8 Easy Pieces *while you run* the compiler. Multiple editing windows allow you to edit, compile, and execute each window individually. With several windows open at the same time, you switch from one open window to another faster than a cat burglar—and never get caught. It's "take the source code and run!"

The 27-Second Guide to Turbo Pascal for the Mac

- Compilation speed of more than 12,000 lines per minute
- "Unit" structure lets you create programs in modular form
- Multiple editing windows—up to 8 at once
- Compilation options include compiling to disk or memory, or compile and run
- No need to switch between programs to compile or run a program
- Streamlined development and debugging
- Compatability with Lisa Pascal™ and Macintosh Programmers' Workshop Pascal
- Compatability with Hierarchical File System of your Mac
- Ability to define default volume and folder names used in compiler directives
- Search and change features in the editor speed up and simplify alteration of routines
- Ability to use all available Macintosh memory without limit
- "Units" included to call all the routines provided by Macintosh Toolbox

Clear your desk, SideKick's here!

SideKick® brings true desktop management and communications to your Mac. Now you can automatically dial phone numbers, log on to bulletin boards, schedule appointments, jot down notes, calculate business expenses—and more—while running all your other Mac software. Once you get SideKick you'll wonder how you ever did without it!

See order form on right-hand page ▶

Introducing Reflex for the Mac, NEW! Borland's remarkable new relational database

Because it is a truly relational database, Reflex for the Mac™ lets you get your various acts together. Lets you connect "A" to "B" to "C," or "Dog" to "Cat" to "Fight." Or whatever links and connections you need to make and need to see. It's a simple spreadsheet-style series of electronic and visual cross-references. There's a clear connection (which you first make by drawing it on-screen) between "Client"—"Matter"—"Attorney"—"Time Sheet"—"Expenses" and "Bill." Or between "Slow Driver in Left-Hand Lane"—"Mile-long Traffic Jam" and "Shot from Behind." It's all relational.

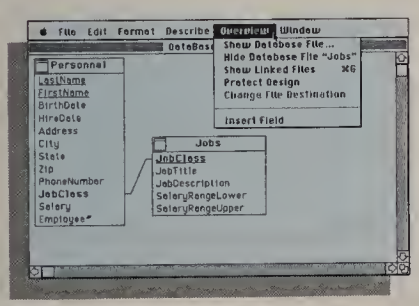
Designed to make the most of your Mac's visual talents, Reflex for the Mac lets you place fields and pictures wherever you want them on the page—and print them that way with your Report Generator.

A funny way to use Reflex for the Mac

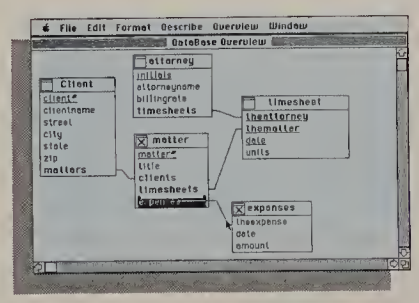
Let's say you have to make a lot of speeches and you like to tell jokes, but can't always remember the right one for the right audience at the right time. So you use Reflex for the Mac to set up multiple files that all connect to each other.

Your "Joke" file connects to your "Audience" file, which is split into categories like "Friendly," "Hostile," "Dumb," "Student" or whatever—all of which are interconnected and relational. Reflex for the Mac lets you find the right joke for the right audience, right now.

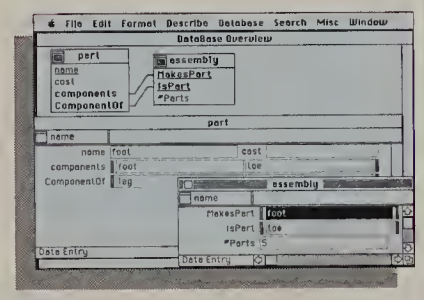
(The serious sides of business include applications like client billing, stock portfolio management, tax planning, and your checkbook.)



After opening the "Overview" window, you draw link lines between databases directly onto your Macintosh screen.



The link lines you draw establish both visual and electronic relationships between your databases.



You can have multiple windows open simultaneously to view all members of a linked set—which are interactive and truly relational.

Mac News for Kangaroos!

Heart of America, one of the U.S. 12-meter contestants in the America's Cup races in Australia, is relying on Reflex for the Mac to help *Bring The Cup Up*. (They're also using Borland's SideKick and Turbo Pascal.) Reflex analyzes 20 different variables like *wind speed, heel angle, backstay load, trim tab angle, rudder angle* and 15 other criteria to show and tell *Heart of America* where to be when—and what to do now to win!

Heart of America's skipper Buddy Melges with Borland International's skipper Philippe Kahn on a testing, training, and analytical run, Santa Cruz, California

You need Reflex for the Mac

Get some Reflex action out of your Mac. Call now. With Reflex for the Mac, you'll have all the right connections—for only $99.95!

"Really uses the visual strength of the Mac to produce a database design tool
Adam Greene, InfoWorld

. . . a stunningly wonderful application generator/dbms
Esther Dyson, Release 1.0

Bridges the gap between the pretty programs and the power programs
Stewart Alsop, PC Letter"

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Minimum system requirements:
Turbo Pascal for the Mac: 256K. Reflex for the Mac: 512K. SideKick for the Mac: 128K.

M52

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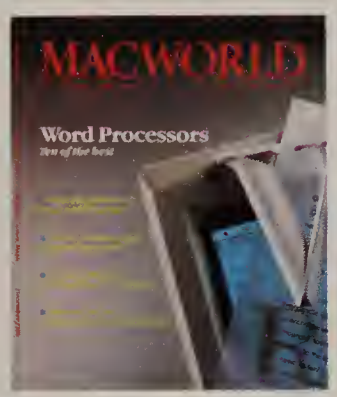
December 1986 *The Macintosh™ Magazine*



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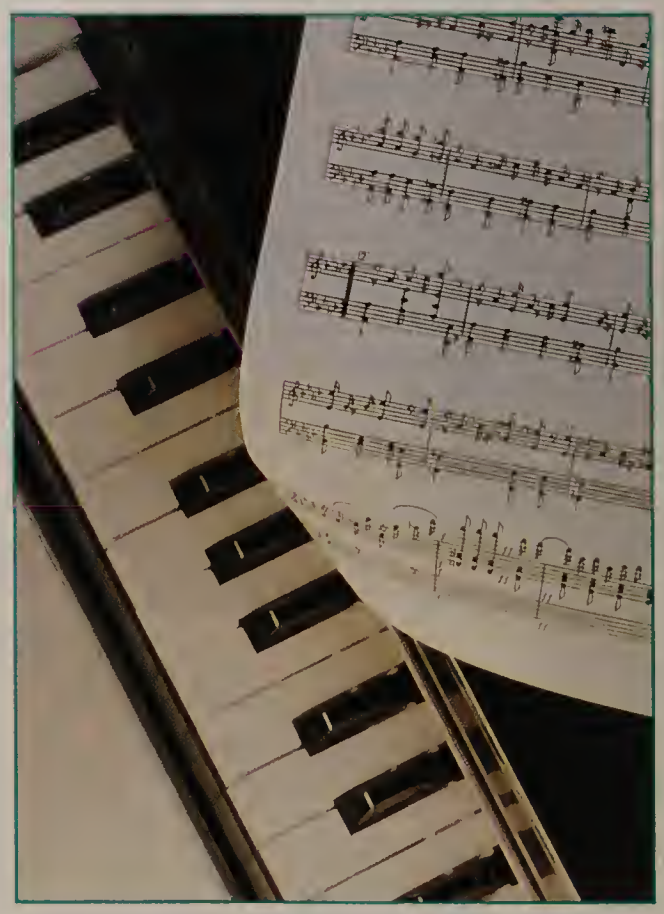

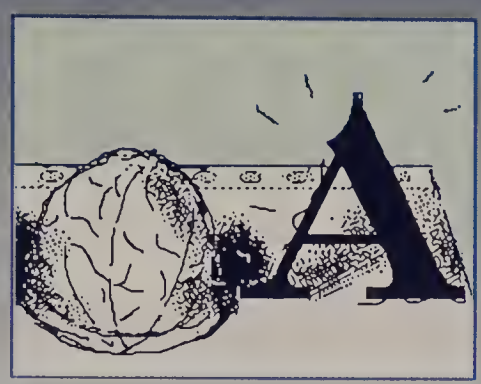

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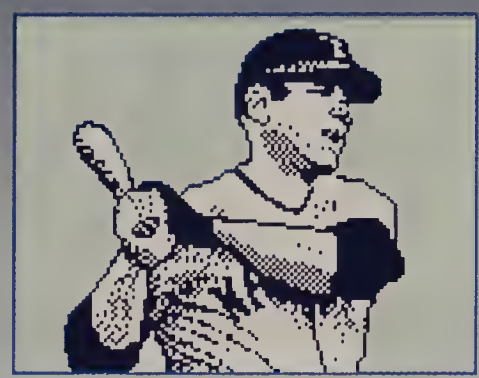

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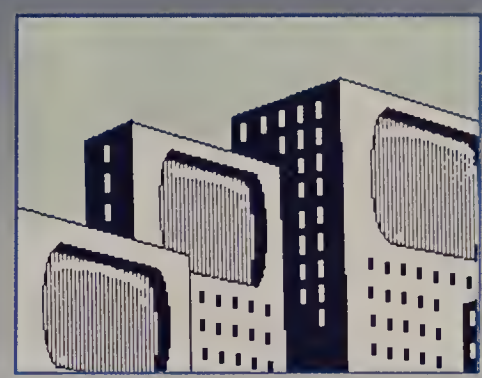

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The Printed Circuit
Quik Circuit PCB design.

What's on TV?
MacVideo Processor TV interface.

Knowledge Workers in Toyland
Toy Shop cardboard toy templates.

Hot Rod BASIC
CLR ToolLib, CLR MathStatLib, and *CLR SpeechLib* BASIC extenders.

LISP in a Shoe Box
MacScheme LISP programming.

Play It Again, Sam(antha)
Alter Ego role-playing game.

Winter Sports, Anyone?
Winter Games Olympic simulation.

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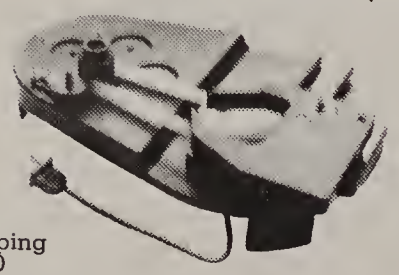

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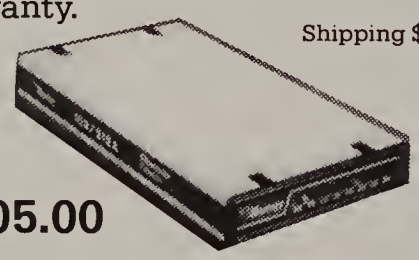

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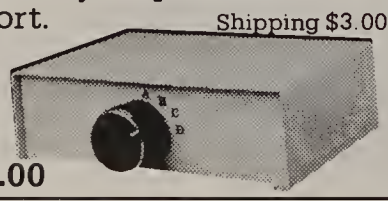

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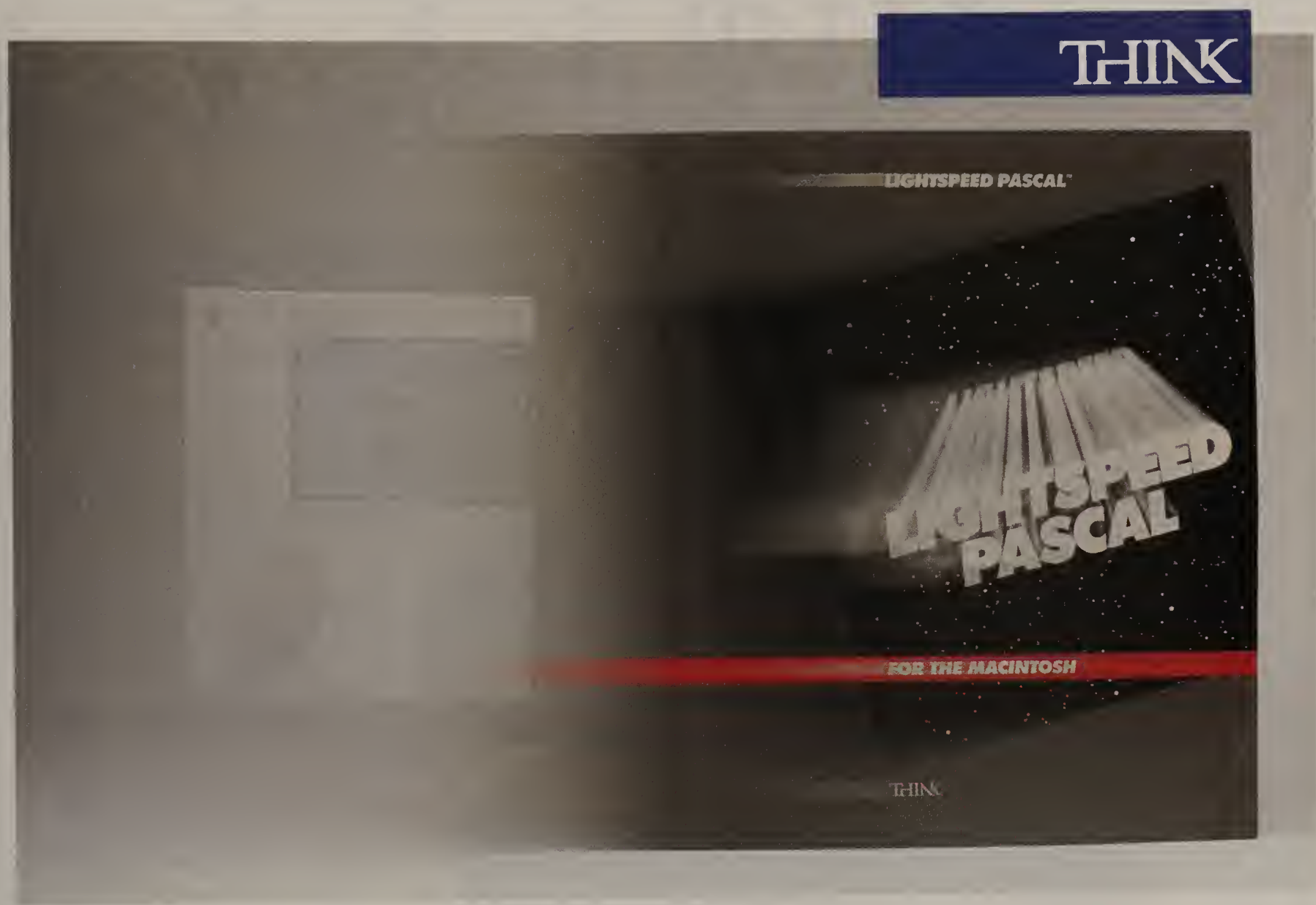

LIGHTSPEED PASCAL™
THE FUTURE REPEATS ITSELF.

JANUARY 1984. (Cupertino, California.)—Apple introduces the Macintosh.™ At the press conference, six software developers, including Microsoft and Lotus, announce their commitment to the new machine. Among them is THINK Technologies, a start-up developer of advanced systems software.

THINK announces Macintosh Pascal. It is a breakthrough. For the first time, a practical interactive interpreter is available for Pascal. People can now learn to program in a whole new way. They can look inside their program and get immediate feedback. Incorporating the Mac interface in this programming environment, THINK creates a new future for the Macintosh in education.

Writing in The New York Times, Erik Sandberg-Diment says "MacPascal alone might be reason enough for the college-bound science or engineering major to purchase" a Mac. The product becomes a standard in university computer science courses. Users are enthusiastic. But in time they demand even more from THINK.

AUGUST 1986. (Boston, Massachusetts.)—THINK introduces Lightspeed Pascal at MacWorld Expo. It is a breakthrough. It utilizes new compiling and linking technology previously available only with THINK's Lightspeed C. But it goes even further. Like Macintosh Pascal, it provides the same ability to look inside a program, but without the need for an interpreter. It offers blinding speed and the ability to build large programs. The response is overwhelming. In the first two weeks THINK sells thousands.

Lightspeed Pascal marks a turning point in programming the Mac. It has all the features that made Macintosh Pascal a standard. And much more. Now users can create real standalone "double-clickable" applications and desk accessories. THINK creates a new future for Macintosh programmers.

Lightspeed Pascal is priced at $125. It is not copy-protected. The package includes a 600-page manual with extensive index. It provides complete Toolbox/OS support. It is compatible with Macintosh Pascal and Lisa Pascal.

The future is here. Order Lightspeed Pascal now.

Please send me Lightspeed Pascal today. Enclosed is $ _____ for _____ copies. ($125/copy)

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Mail to: THINK Technologies, 420 Bedford Street, Lexington, MA 02173. Or call 617-863-5595

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We'll make it easy

Face it. You're a job hopper. Constantly skipping from one kind of crisis to another.

With that in mind, we are pleased to announce a program that can change gears as fast as you do: Microsoft® Works. A one disk program which gracefully integrates the four fundamental tools you need at work:

Word processing, for writing memos, reports, presentations.

A database tool, to keep track of clients, jobs, vendors.

A spreadsheet with charting abilities, to compute, analyze, interpret, and then graph anything to do with finance or numbers.

Finally a communications tool which lets you get stock quotes, make travel reservations, do research, and send reports across the country, right over the phone lines.

for you to change jobs.

Microsoft Works lets you juggle all these jobs, move swiftly and easily between them, while transferring and combining their information as you please. Because you do all these jobs with one, easy to learn, totally integrated program.

Quick study. Quick change.

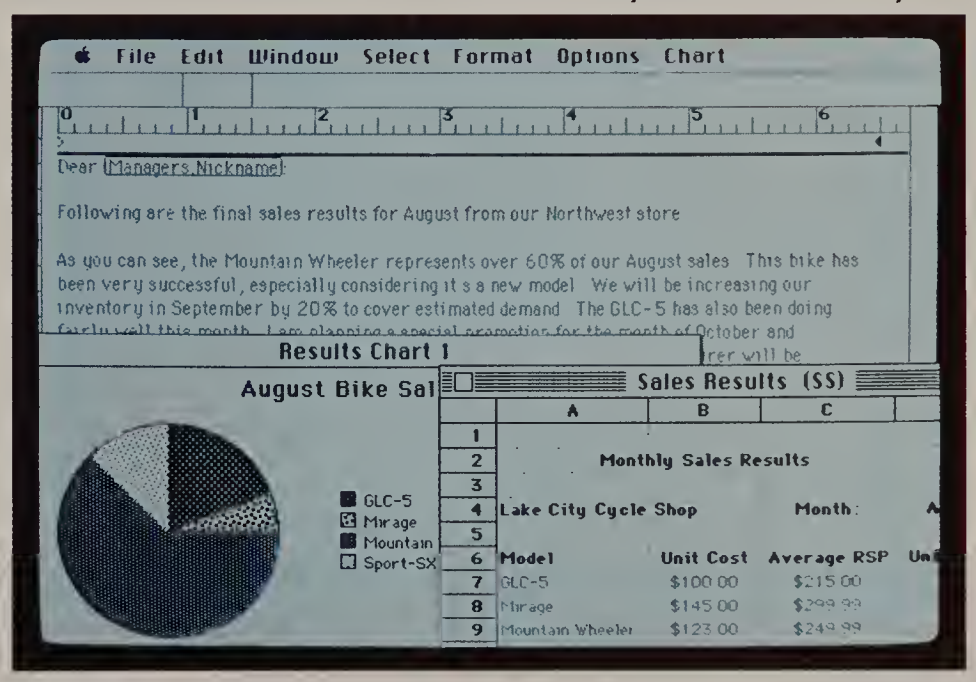
The first job is the easiest. Learning to use Microsoft Works.

It's a snap. The overall program and each tool within runs Macintosh™ style. Which, as you probably know, is a natural, common sense, point-at-what-you-want system.

And Microsoft Works is seamlessly melded together. You can have all four tools on screen at once. Jump instantly from one to another. And later combine work done in each part of the program on a single printed page.

This easy exchange of data makes jobs go faster and easier. One practical example being mass mailings of form letters where you need to combine names from the database with text written in the word processor.

All in all, Microsoft Works is a superb solution for day to day, get-it-done problems. An inspiring display of convenience, efficiency, and utility.



And, of course, it's a product of Microsoft, the preeminent developer of programs for the Macintosh. Which is not a claim, it's a fact.

If you're in a business that won't let you stick to one thing, check out Microsoft Works. The program that can change jobs as fast as you do.

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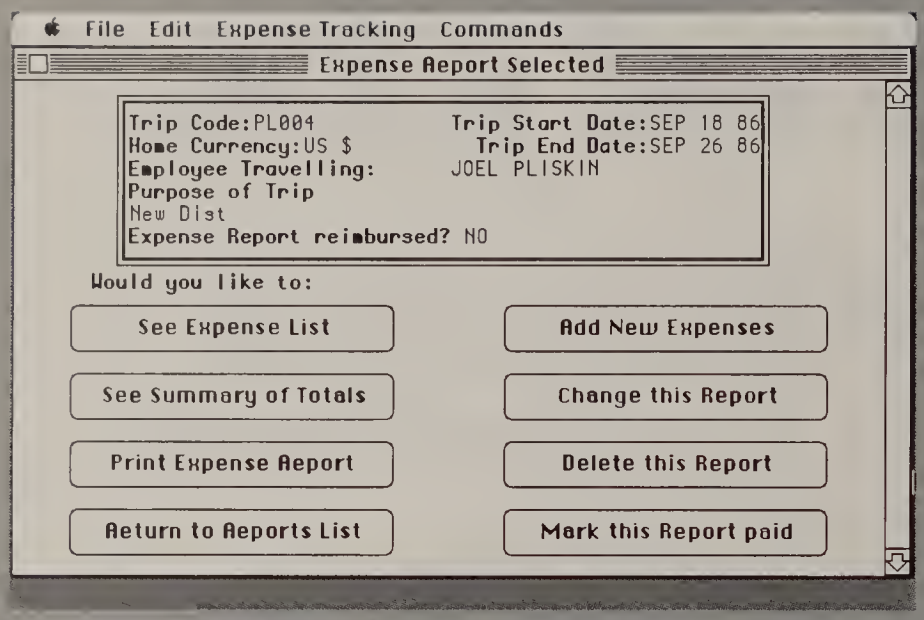
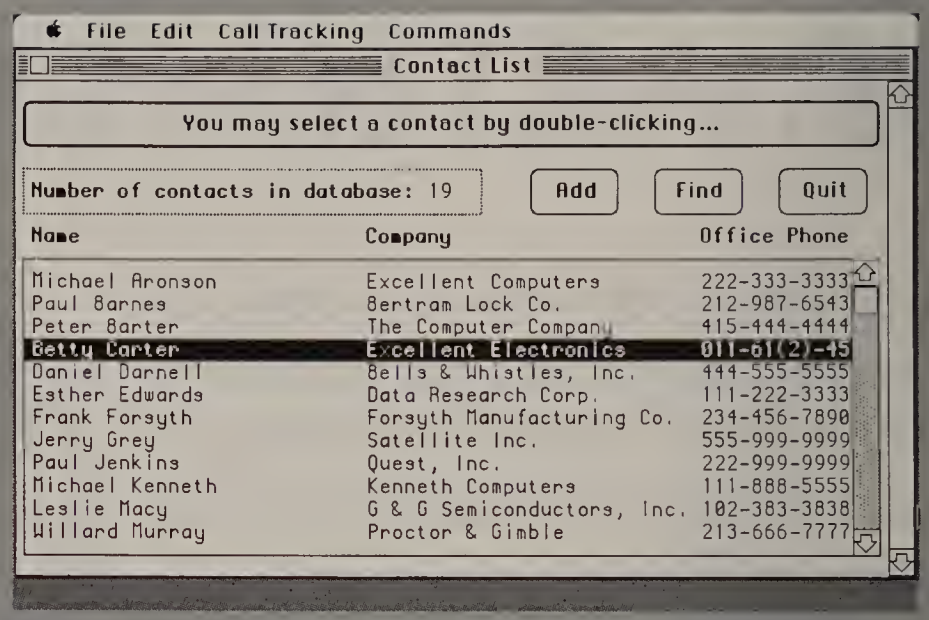
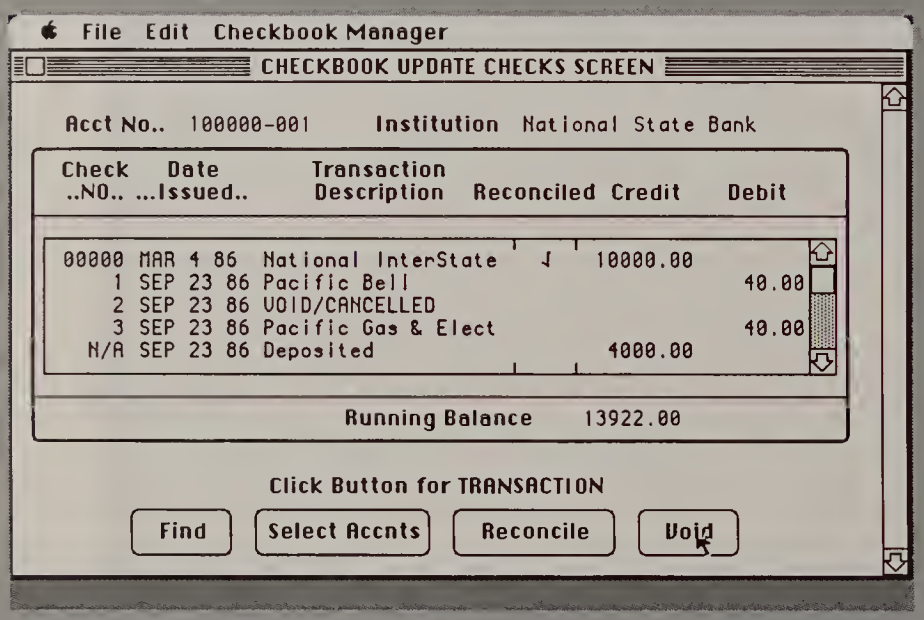


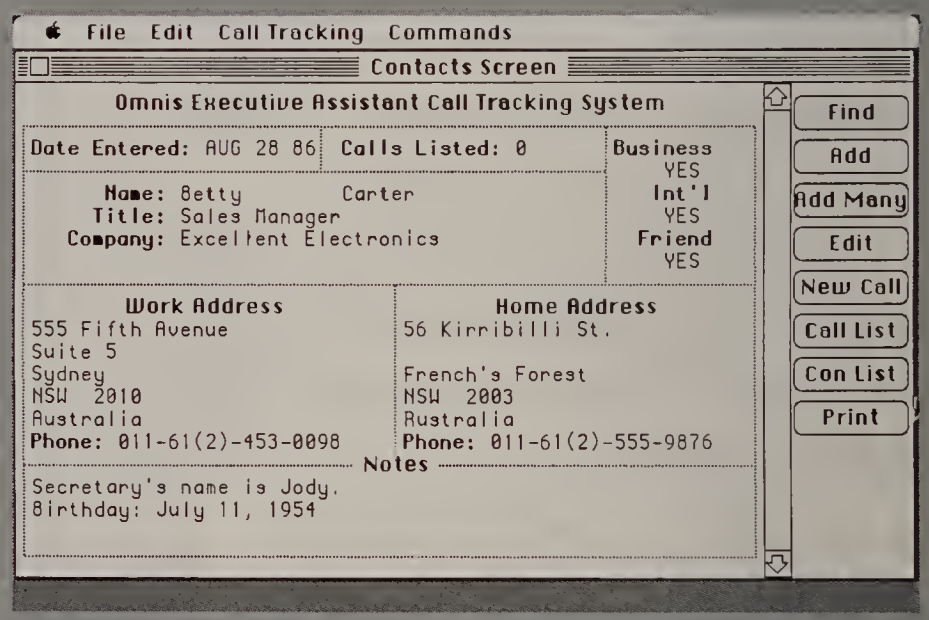
EXPENSE TRACKING *With the Executive Assistant Expense Tracking module, you can quickly get a report of who's spending money, where they're spending it, and how. And it also generates month-end summaries.*



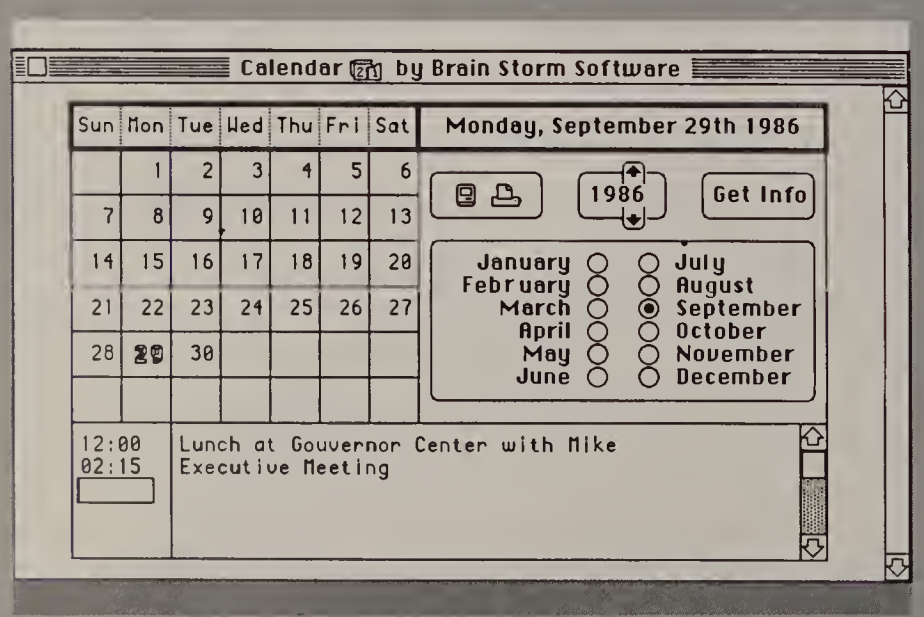
CONTACT LIST *The Contact List module replaces your Rolodex and allows you to scroll quickly through your client lists for their current company and phone number.*



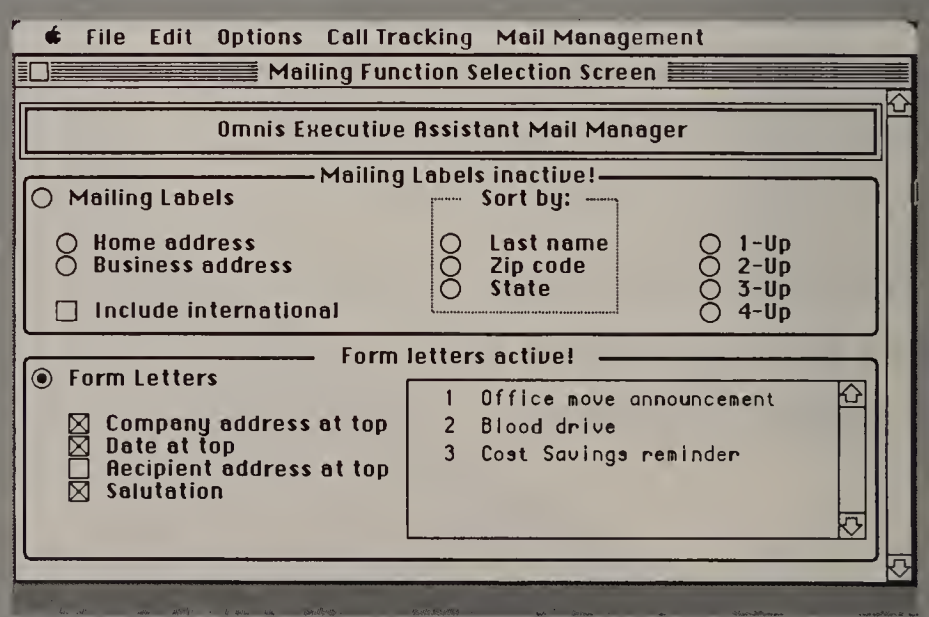
CHECKBOOK MANAGER *The Checkbook Manager module can handle an unlimited number of checks, and keeps track of tax deductions and budgets. It also balances automatically, and can accommodate ATM deposits and withdrawals.*



CALL TRACKING *Call Tracking gives you the ability to monitor sales contacts. The advanced functionality also allows you to add, delete, edit, document and then print the sales activity for a specific contact.*



CALENDAR *The Executive Assistant Calendar keeps you on track and on time. You can print out your weekly schedule in advance, or isolate certain times of the day or week.*



MAIL LIST *Using the Mail List function, you can add and delete names, as well as print out labels whenever you need them. You can even select and sort by name, ZIP Code, state or country.*

The actual package screens may vary from those pictured.

$8.33 EACH.

If your desk has a calendar, a stack of business leads, expense reports, the ever-present "miscellaneous" folder and who-knows-what-else cluttering it up, the OMNIS® Executive Assistant can help you restore a little order.

The OMNIS Executive Assistant can turn the most reproductive part of your desk into the most productive. In fact, the office productivity tools you see on your left are exactly what you need to get your business running right. And now you can get them all in one integrated package written in Omnis 3 Plus, the most powerful and popular selling database for the Macintosh.

Like a calendar program that lets you plan your day, your week, your month and your year—in increments of as little as 15 minutes.

Or a module that helps you keep track of leads, meet your commitments on time, and follow the progress of a sale. Or one that lets you stay on top of expenses. So you can keep track of where each dollar is coming from—and where it's going.

We've also included a mail list function and check book manager. To help keep your letters and numbers in order.

All of which means you won't be pushing aside the Rolodex anymore to get at your calendar. Or vice versa.

Because everything you need is, literally, at your fingertips.

For a limited time, this $100 package is available for under $50. And because it provides, at the click of the mouse, the most commonly used day-to-day business applications, the OMNIS Executive Assistant is sure to pay for itself in no time.

And if you're like most business professionals, time is money. So we've made it easy for you to spend less of both. Simply complete the coupon below or call us at 1-800-843-8615 (inside California call 1-800-223-8050). Or contact your local OMNIS dealer.

The OMNIS Executive Assistant.

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Send to: Blyth Software, Inc., 2929 Campus Drive, Suite 425, San Mateo, CA 94403. Enclosed is my check for $49.95 (plus $5.00 shipping and handling; California residents add 6.5% sales tax ($3.25)). Please send me a copy of the Executive Assistant today.

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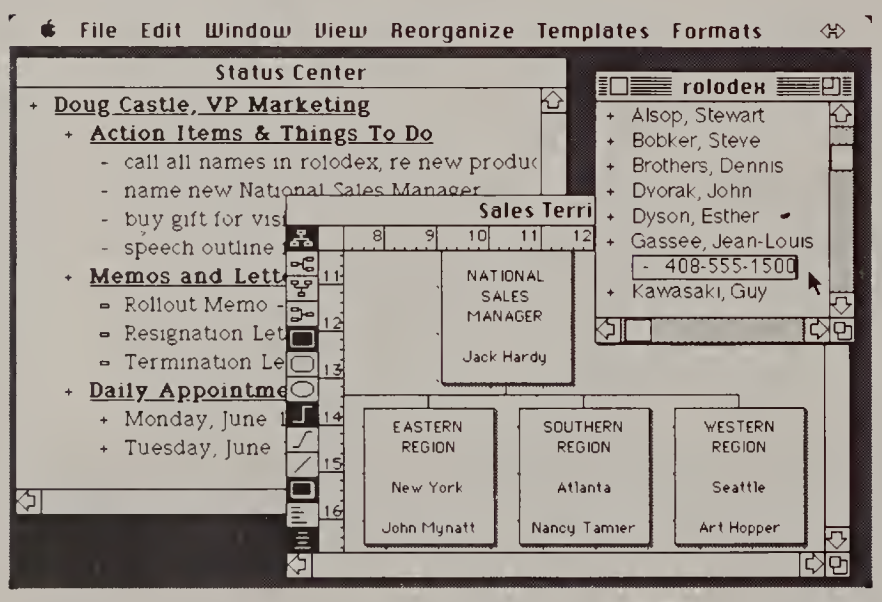

MORE is more than an idea processor, because Bullet Charts and Tree Charts make it easy to graphically present your ideas. That's why we say that MORE is the first **integrated idea processor/idea presenter.** It's a complete system for developing and refining your ideas. Then it quickly and automatically transforms your ideas into a presentation that looks so good you'd think a professional spent hours working in MacDraw.

MORE is for people whose primary product is their thinking—for example, managers, consultants, professionals, advertising and public relations people. MORE is widely used in corporations where presentations are a normal course of daily business. Reporters can track their contacts, and cross-reference them by specialty. It's great for students and teachers too!

MORE Intelligent Idea Processing

Hoisting: focus on one section of an outline
Cloning: dynamic outline cross-references
Mark + gather: automated reorganization
Pattern matching: context sensitive and intelligent
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From Living Videotext—the undisputed leaders in idea processing technology

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MORE Macintosh Power

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Power Supply

▶ Reports from readers about short-lived Macintosh power-supply boards led us to contact dealers around the country to learn how widespread the problem was. Service managers and technicians in the stores were nearly unanimous in calling the power-supply burnout rate very high. One service manager said he repairs a good number of power supplies before the 90-day warranty period is up; most service technicians said to consider yourself lucky if your power supply lasts a year.

Apple spokeswoman Lisa Van Horn said upgrades cause the problem; the logic boards swapped into the Macs for an upgrade pull a different load from the power supply, but technicians in the stores weren't alerted to make any changes so the power supply could accommodate the new logic boards. At press time, Apple planned to inform dealers by November 1 how to perform tests and make the proper adjustments to see that the power supply can support the upgrade before the Mac is returned to its owner.

More Success

▶ Living Videotext reports an astounding 15,000 copies of *More* sold in the first month after its release. Spot calls to retailers around the country confirm that sales are hot for the successor to the company's popular *ThinkTank* outliner.

Polyglot Macintosh

▶ The Macintosh is living up to its reputation as the most international of all computers. Last month we mentioned the forthcoming Arabic and Hebrew versions; Apple is also expected to ship Greek, Turkish, and Norwegian versions of the Mac in the near future. Apple is supplying the system software and localization tools so that English-language software can be converted for the new machines.

Of course, members of the academic and business communities in English-speaking countries have been clamoring for international Macs too. Although Apple has not yet committed to supplying foreign-language machines outside their home countries, the company is looking into ways of providing the sale and support service that would allow the international machines to become expatriates.

A Choice in Laser Printers

▶ The Laser Connection of Mobile, Alabama, has introduced a device that adds variety to the Mac laser printing scene by allowing low-end laser printers to produce complex documents formatted with PostScript. The $2995 PS Jet adds on to Hewlett-Packard, QMS, or Canon laser printers and turns them into PostScript-compatible printers like the Apple LaserWriter. This development enables the printers to do sophisticated page layout and other tasks with programs such as *PageMaker, MacDraw, MacPaint, MacWrite,* and other products with PostScript drivers. PS Jet comes with the same four families of typefaces that are built into the LaserWriter and QMS-PS. In addition, because the PS Jet has even more memory for fonts (279K) and downloading (264K) than the LaserWriter and LaserWriter Plus, some font-handling tasks may be simpler than with the Apple laser printer.

No More Tours

▶ At the end of September, Apple stopped giving tours of its Fremont, California, automated manufacturing plant, customarily a prelude to retooling for production of a new machine.

Protection Racket Breaks Up

▶ Microsoft, one of the last big Mac software publishers to hold onto copy protection, will release its new versions of *Word* and *Excel* without copy protection. With the growing use of hard disk drives, software companies had come under fire for inconvenient copy-protection schemes that frustrate users. Finally even the industry lobbying organization, ADAPSO, retreated from its hard-line position and admitted that corporate users just won't accept the obstructive practices. "The customer won," commented Microsoft head William Gates in a *Wall Street Journal* item on the company's move. That leaves Lotus Development nearly alone on the barricade—and taking plenty of heat for it. Game publishers, however, will probably continue to buck the trend toward unprotected programs.

How Many Ways to Scan a Cat?

▶ With the current desktop publishing craze, it was only a matter of time before more digitizers and scanners entered the market to join Thunderware's ThunderScan. New Image Technology of Seabrook, Maryland, recently introduced the Magic digitizer and $49 *LaserMagic* software that works with the scanner to produce 300-dots-per-inch PostScript or *PageMaker* format images, which can be printed with a LaserWriter or Linotronic printer. Almost in the same breath, New Image released MacScan, a scanner package containing a flat scanning device, a SCSI adapter that allows it to run on the Mac Plus, and software for capturing and editing the scanned image and then saving it in *PageMaker* or *MacPaint* format. The software allows the image to be manipulated with PostScript commands or sent straight to the LaserWriter. The interface and software work with the new Canon IX-12 and the Princeton Graphic Systems LS-300, pro-

(continues)

ducing a resolution of up to 300 dots per inch. The MacScan package goes for $1395; the interface alone is $499.

At Comdex in November, AST Research introduced TurboScan, its version of the Microtek 300-dots-per-inch scanner. Microtek is now marketing the scanner directly to Macintosh owners, and Abaton is putting out another Mac version of the same scanner with its halftone and image-editing software. AST hopes to capture its share of the scanner market with easy-to-use Mac-like software and tools and with a lower price than Abaton and Microtek's $2495.

DEST Corporation, best known for its document readers for dedicated word processors, has also announced a page scanner that can render halftones in 16 shades of gray. PC Scan Plus and the accompanying software scan text (in ASCII form) and graphics onto the Mac for use in desktop publishing programs. The images convert in the TIFF (tagged image file format) form developed jointly by Aldus, Microsoft, and DEST to serve as a graphics corollary to ASCII. The PC Scan Plus lists for $2495; a separate Macintosh interface, available at year's end, will retail for under $300.

Turbo Touch Rolls Again

▶ Mac Turbo Touch, the alternative to the mouse formerly distributed by now-defunct Assimilation, has a new name and a new avenue to the marketplace. Kensington Microware of New York has rechristened the product Turbo Mouse and plans to introduce a version this month that works with both the Mac and the Apple II, possibly even with the new IIGS. The input device has a new price too—$149.

Cambridge Automation of Cerritos, California, manufacturers of Assimilation's ill-fated peripherals, still distributes and supports the other survivors of the line: Numeric Turbo, MIDI Conductor, and Mac Port Adaptor.

Free FullPaint Upgrade

▶ Software buyers may hope that Ann Arbor Softworks starts another consumer-oriented trend with its free upgrade to the popular *FullPaint*. The upgrade, sent automatically to registered owners, removes copy protection and includes a color-printing utility.

Closing the Mac-PC Gap

▶ Recently announced products make it easier to transfer information between Macs and IBM PCs, mainframes, and computers from other manufacturers such as DEC, Data General, and Hewlett-Packard. Northern Telecom of Nashville, Tennessee, has brought out a group of software and networking products that use ordinary telephone lines to connect the Mac and computers made by other companies. Communications take place at speeds of up to 19,200 bps.

The new products include the System 36 Gateway and the Lanstar 3276 protocol converter, which allow the Mac to communicate with IBM System 36 and 38 business systems and to emulate IBM 3270 terminals. The new Computer to PBX Interface (CPI) lets the Mac interact with DEC and Data General computers through an office's PBX telephone system, drastically reducing the cost of connecting. Northern Telecom's Asynchronous Interface Line Card (AILC), used with HP's Advanced Terminal Processor, permits Macs to communicate with HP 3000 systems.

The Macintosh Meridian network works with Apple's easy-to-use AppleLink electronic mail system and with a $145 customized version of Palantir Software's *inTalk* that lets users click on the name of an on-line information service to automatically connect. DataViz of Norwalk, Connecticut, is developing a version of *MacLink* that would work with Telecom's PBXs to automatically convert Mac files to and from IBM's DOS format.

The system would, for example, allow a user to transfer an IBM file to the Mac for editing and design and then to a LaserWriter for printing.

New 3Com File Server

▶ 3Com of Santa Clara, California, announced a new disk server, the 3Server3, and upgraded *EtherSeries Enhanced* software that lets Mac users control the network directly instead of going through an IBM PC. The 3Server3, reported to be 20 percent faster than its predecessor, contains a 70-megabyte hard disk, an 80186 processor, and a SCSI expansion port where you can add up to 720 megabytes of disk storage. The 3Server3 allows PCs on Ethernet and Macs on AppleTalk to share network disk storage. The base price for the server is $5995; the 60MB tape backup unit is $1995, and 120MB expansion units are $3995.

'Tis the Season to Be Selling

▶ Apple Computer dropped suggested retail prices of its Macs and the LaserWriter at the end of September, just in time for the Christmas shopping season. The Mac Plus price was cut to $2199 from $2599, and 512K Enhanced machines are $1699, down from $1999. The LaserWriter price dropped to $4999 from $5999. With discounts, prices go even lower; at press time the lowest advertised price seen for a Mac Plus was $1695.

Corporate Test-Drive a Mac

▶ Late in September Apple announced its latest effort to scale the walls of America's corporations with a program to loan Macs, LaserWriters, and software such as *Microsoft Excel* to Fortune 1000 companies. Apple's 18 regional business development managers handle the program, which is intended to ensure that Apple makes the corporations' approved vendors list. Local dealers provide the support for the borrowed equipment and reap the rewards of any resulting sales. An earlier program of corporate evaluation units resulted in sales to more than 75 percent of the participants, according to Sandra Sakaguchi, Apple business programs specialist. The loans for big business will be for an extended period, compared to the 24-hour "Test-Drive a Mac" promotion through dealers in 1984. □

See what you've been missing.

Full page views of your documents, for example. Unobstructed displays of several windows simultaneously. And dozens of other applications for which the Macintosh™ has been able to give you only part of the story. Until now, that is.

Introducing the Radius Full Page Display.

The Radius FPD™ works side by side with your Macintosh to make creating, editing, and laying out documents easier than ever — by letting you see a full 8½" by 11" page.

That means less scrolling. Less enlarging and reducing. And, because your Macintosh doesn't sit idle, a much more useful way to work.

The FPD extends your investment in the Macintosh.

Lay out a page on the FPD, for example, while the Macintosh holds tools, palettes, desk accessories, and other windows. Or treat the two screens as a single, contiguous display, viewing large, horizontal documents. Even drag text or graphics between the two.

The FPD is in every way an extension of your Macintosh, from the electronics to the aesthetics. But then, there's a good reason for that.

The team that developed the Radius FPD is the same group of experts that designed and built the original Macintosh. Which means you're assured of the highest-quality product, from top to bottom.

Want to find out more? Contact your nearest authorized Radius dealer to get the full story. (Or call us at 408-732-1010 for the name of the dealer nearest you.)

And see what you've been missing.

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File Edit Tools Page Type Lines Shades
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toolbox

THE ROFFMAN LETTER

Volume 4 Number 1

Fall Issue

Part II of a Special Report on Desktop Publishing

The Radius Full Page Display

In a remarkably short period of time Desktop Publishing has evolved from an obscure phrase into a multi-million dollar business.

Our previous issue focused on the definition and analysis of the desktop publishing phenomenon. In this report we will discuss two companies which will significantly contribute to and benefit from the growth of the desktop publishing market.

The first company is Radius Inc. Founded by four members of the original Macintosh design and production team, Radius manufactures the missing piece for the most popular desktop publishing system: a large display for the Macintosh computer. Macintosh with the Apple LaserWriter printer was instrumental in the desktop publishing boom. The one limitation of the Macintosh is its small screen size. The Radius Full Page Display™ provides the needed remedy.

The FPD™, as it is commonly known, is large enough to show the contents of an entire 8 1/2 X 11 page on the screen, exactly as it will look printed. The availability of the extra space not only eliminates the need for time-consuming scrolling, but provides immediate visual feedback on the composition and contents of the document.

What we found particularly useful about the FPD, is the clever way it makes use of the Macintosh screen. The FPD is used as an extension of the Macintosh screen. The boundaries between the two displays are totally transparent and objects can be dragged from one to the other with the mouse. This means that the FPD can hold the document contents while the Macintosh screen is devoted to the desk accessories and other tools useful in the creation of the document.

Radius designers devoted substantial attention to ergonomics. The screen is flicker free under all lighting conditions. Rear and front tilt are independently adjustable.

LaserWriter users will find the Full Page Display a natural complement to their current configurations. The Radius Full Page Display will

continued on page 11

The Roffmann Letter Projections

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Laser Printers

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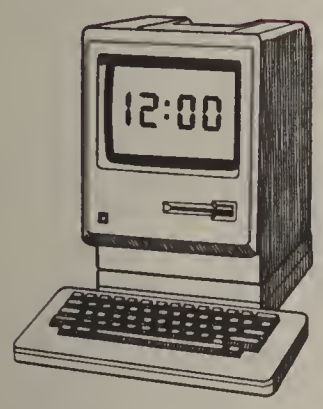

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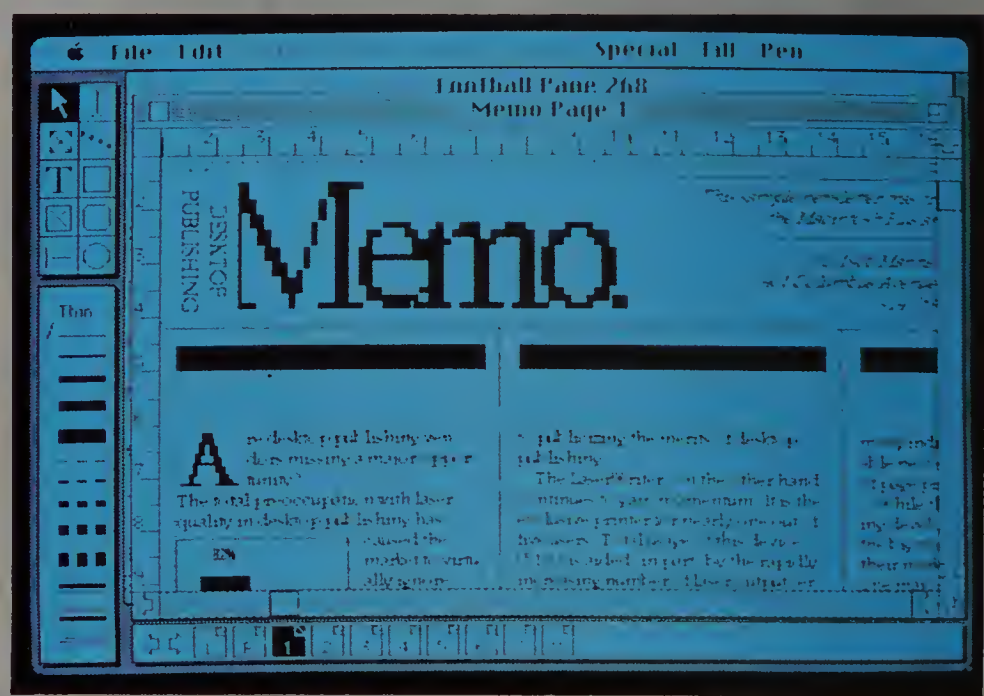

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David Bunnell

Fighting PC Protectionism

The OPEC of high tech is going to triple the price of memory chips—unless we can break the chip cartel

Recently, two events occurred in the personal computer world that made American semiconductor manufacturers, particularly Intel Corporation, feel positively euphoric.

In the first instance a secret trade agreement about semiconductors was reached by the United States and Japan. In the second instance a U.S. federal judge ruled in Intel's favor against the Japanese chip giant NEC Corporation, upholding Intel's copyright of microchip codes.

On the surface these developments appear to be a great victory for U.S. integrated circuit manufacturers over the Japanese.

But guess who'll be the loser. The consumer. Why? Because the consumer is bound to end up paying higher prices for personal computers in this newly realigned marketplace.

And who speaks for the consumer in these negotiations between the United States and Japan?

No one.

Let's take a look at the trade agreement and what it has wrought. The issue presented to the public and touted to the industry is that the Japanese have been dumping chips on the U.S. market to gain market share. This in turn has put a great strain on our national semiconductor industry.

But that's not the real problem.

What's really at issue here is the enormous oversupply of chips. Worldwide production capacity has far exceeded the demand. Microchip manufacturers came up with some pretty wild estimates of how big the market—and their share of it—would be.

So they went overboard and produced a glut of chips. Once that happened, they were forced to sell their chips at whatever price the market was willing to pay.

When American companies sell their products in a world market at a price the market will bear, we call it "free enterprise." But when the Japanese do the same thing, we call it "predatory pricing" and accuse them of "anticompetitive trade practices."

At any rate, U.S. chip manufacturers went running to the Department of Commerce with their skinned knees and got some administration economists to come up with a "fair market value" for chips, as a salve for their wounds.

So the pie-chart wizards conferred and actually arrived at an estimate—a troubling development, as I see it.

Since when do Washington bureaucrats decide what constitutes a "fair" price? That's something the market is supposed to determine, isn't it?

Will Zachmann, vice president of International Data Corporation, compares the semiconductor industry's action to the creation of the oil cartel. He calls it the "OPEC of high tech."

I believe he's essentially right, because the real aim of the semiconductor agreement with Japan is to raise the price of chips. The implication of the agreement is that a 256K-bit DRAM (dynamic random access memory) chip will sell for $5.79—almost three times its current street value.

When a 256K-bit chip costs the PC manufacturer $2, a megabyte of memory comes to about $65. But by the time it's put on a circuit board, marked up, marketed, and sold to the consumer, a megabyte of memory at today's prices sells for between $250 and $300.

By inflating the chip price, our semiconductor manufacturers will be driving up the cost to the consumer of a megabyte of memory to over $500—back to where we were in the early stages of the personal computer's development.

This could have an extremely dampening effect on the proliferation of personal computers, because so much new technology depends on having more memory.

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(continues)

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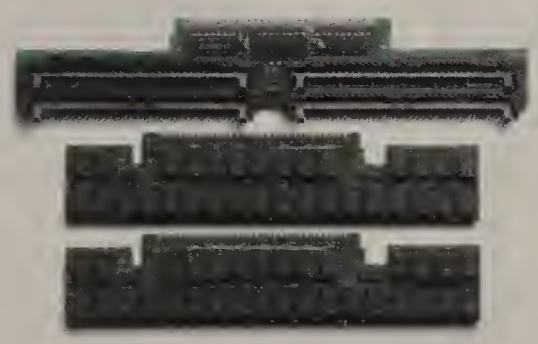

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It will mean that the really capable systems we've all been dreaming about, with their terrific graphics and megamemory, are going to cost a lot more than we expected. This will hurt not only consumers but also the smaller computer companies and makers of peripherals. It will also adversely affect people who produce add-on boards, local area networks, laser printers, and other memory-intensive systems.

Who derives the greatest advantage from all this price hiking? The semiconductor manufacturers and the large computer manufacturers who make their own chips—because they can still make a chip for $2 or less while smaller companies are paying $5.79.

In the long run, the coming price hike will even hurt the semiconductor companies themselves, by slowing down the overall growth of the personal computer and its market.

The other recent decision in the chip area—the case of Intel versus NEC Corporation—may also adversely affect the consumer.

The U.S. federal court ruled that the microcode embedded in a chip can be copyrighted. Therefore, NEC can no longer sell chips that are copies of Intel's family of 8088, 8086, and 286 chips, which power all IBM-standard PCs. Now, any company that wants to be a secondary source for another manufacturer's microprocessor chip has to go to the time and expense of re-creating the functional equivalent of Intel's chip without using Intel's original microcode.

While I acknowledge that the microcode judgment has considerable merit because it involves the protection of a creative property, I'm still troubled by the possible consequences.

For one thing, the decision could have a serious impact on the availability of IBM personal computer clones. And as with the higher cost of memory, we're also likely to see higher personal computer prices.

Perhaps there should be a consumers' computer association. Consumers' voices weren't heard in the courtroom during the Intel-NEC deliberations. They weren't in the smoke-filled rooms where the negotiators for the Department of Commerce and the U.S. and Japanese semiconductor companies got together and hammered out their secret trade agreement.

Incidentally, why were the details of the agreement kept secret? Could it be, as IDC's Will Zachmann suggests, that knowledge is being withheld from American consumers about what amounts to a conspiracy (actively encouraged by the United States government) between U.S. and Japanese semiconductor vendors to drive up worldwide chip prices?

Once again, the consumer is consumed by big-business interests. What can be done about all this? Protectionism doesn't work. □

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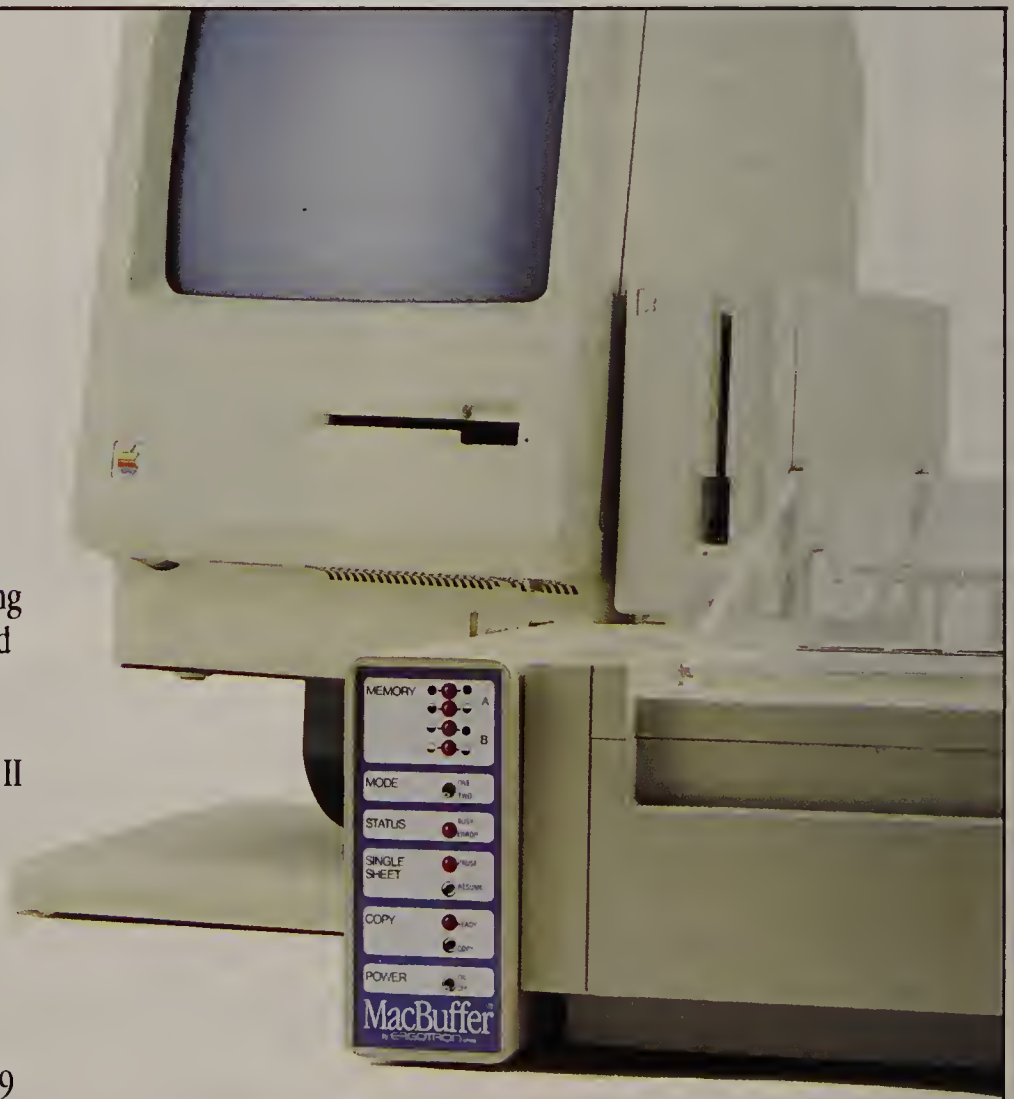

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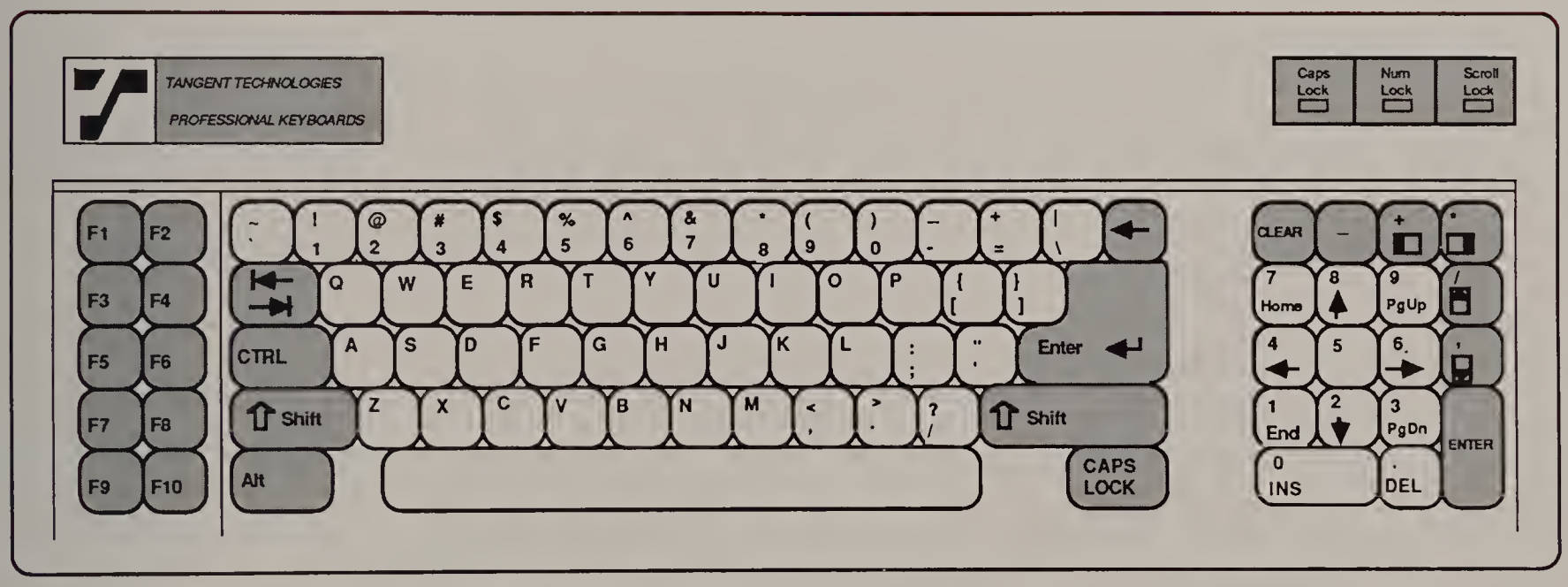

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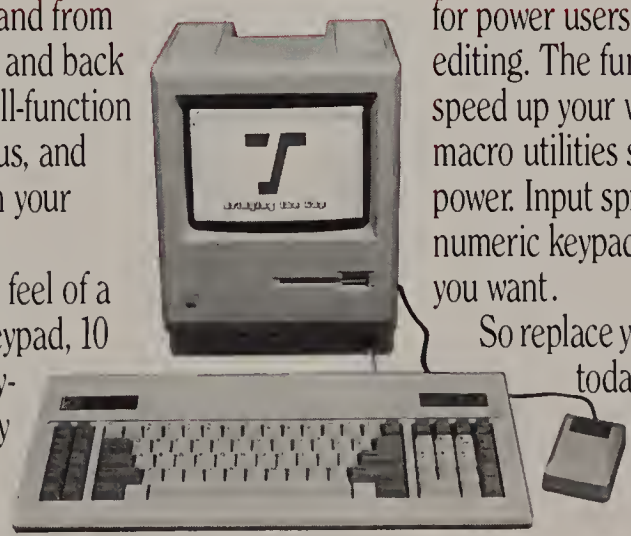

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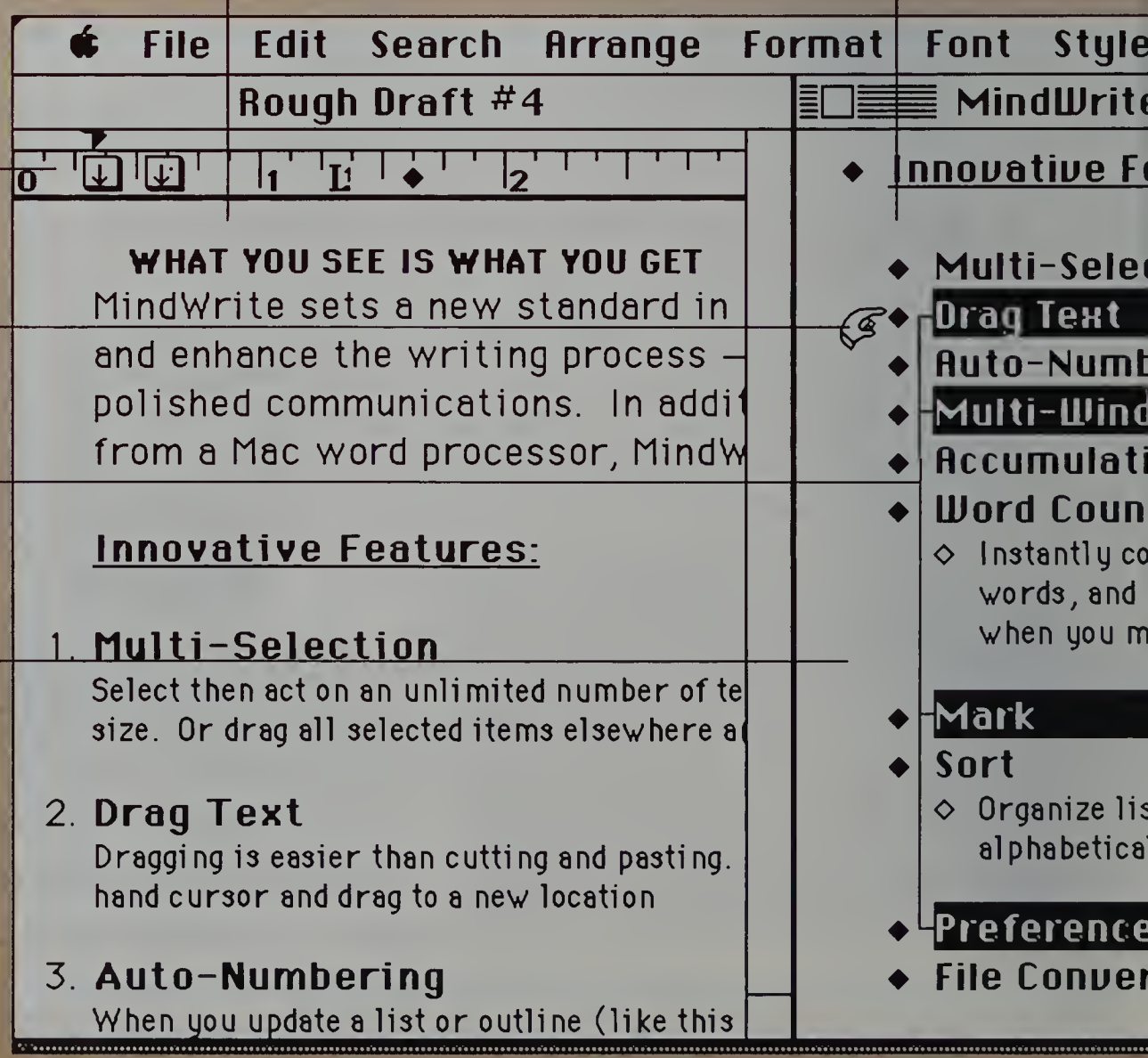

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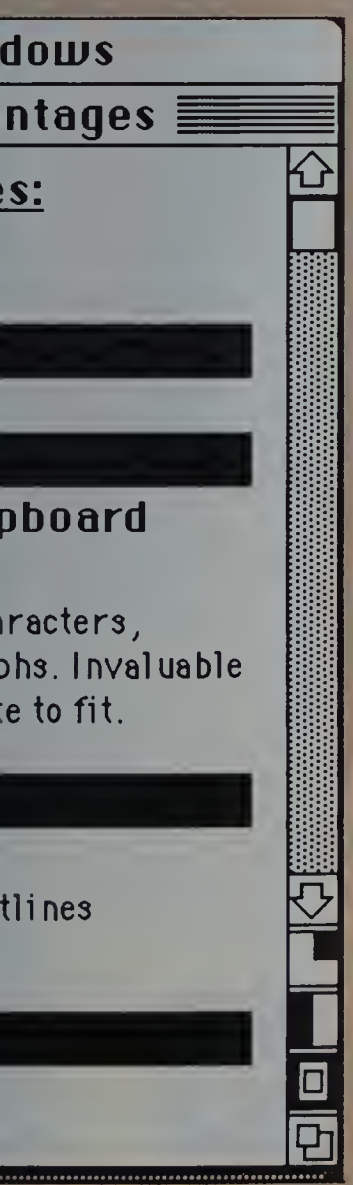

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All your cut and copied text is accumulated in the [illegible] extensive Undo feature to protect you from most mis[illegible]

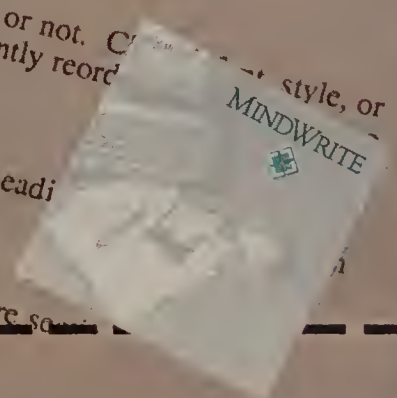
6. Word Count
Instantly counts characters, words, and paragraphs. In[illegible]

7. Mark
Identifies paragraphs that have been revised within a [illegible] easily find and review recent changes to your document.

8. Sort
Organize lists or outlines alphabetically.

9. Preference
Customize MindWrite to fit your personal needs with preference sets you create and save. Se[illegible] default font and size for new documents, enable/disable Quick key shortcuts, turn [illegible] autonumbering, show/hide rulers and pagination, choose search options, wrap [illegible] or ruler.

10. File Conversion
No need to start over. MindWrite will [illegible] can save MindWrite files to [illegible] as PageMaker™



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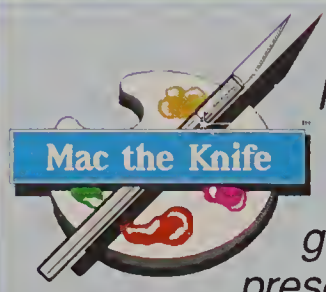

Miles Computing, the originator of Mac The Knife graphics software, presents two exciting, useful new collections of clip art, decorative fonts, and word processing fonts. And be sure to check out Quintette, the latest from Miles Computing's Entertainment Software division!

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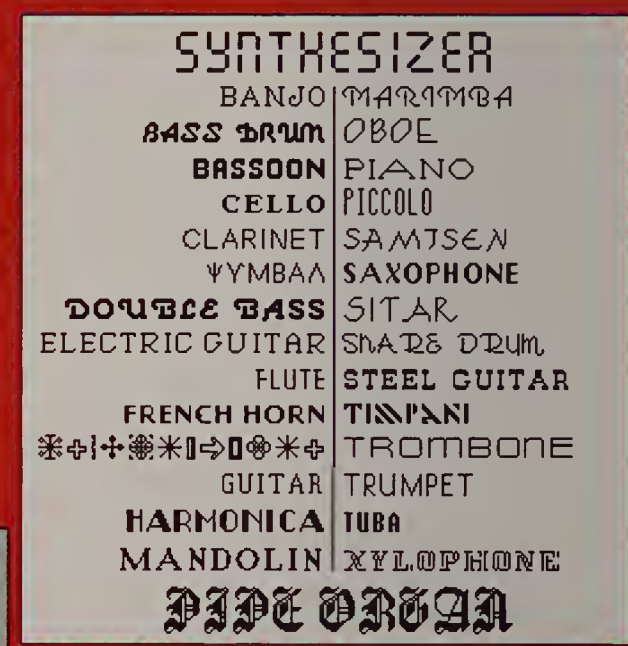
Mac The Knife IV

Orchestra of Fonts

Introducing 30 never before released word processing fonts for Macintosh! Orchestra of Fonts is a two-disk set which includes fonts for every type of letter, form, or correspondence, most in five sizes from 9 through 24 point. Now you can use exactly the font you want for any kind of text - from mild to wild!

It's the one set no Mac should be without!



Mac The Knife III

A Two Disk Set that sets new standards for clip art illustrations & decorative typefaces!

Disk One: A Clip Art Treasury
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The most complete clip art collection available for Macintosh, Clip Art Treasury includes hundreds of unique MacPaint images and borders for special occasions and holidays like Christmas, New Year, Hanukkah, Valentine's Day, Halloween, Easter, and many more!

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We think Confucius would be proud.

Miles Computing, Inc.
7741 Alabama Ave.# 2
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Choose your scale and units and MacDraft will do the rest. Dimensions of objects, snap grids, rulers, cursor positions, area calculations and auto dimension lines will be computed for you.

New Features:

Resize groups & bit maps proportionally. Bit maps can also be stretched in an X, Y direction independently.

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Hard disk install or de-install your copy of MacDraft.

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415/680-6818

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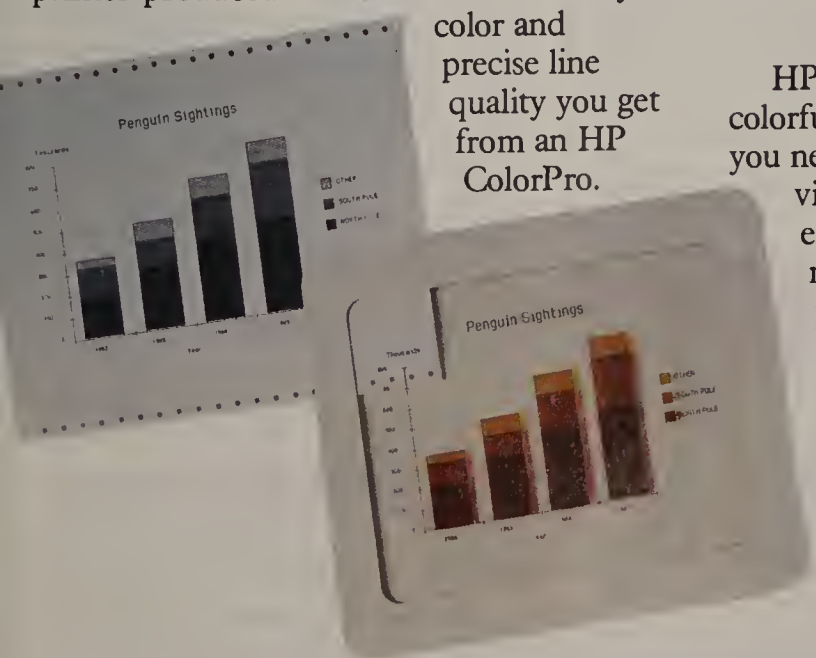

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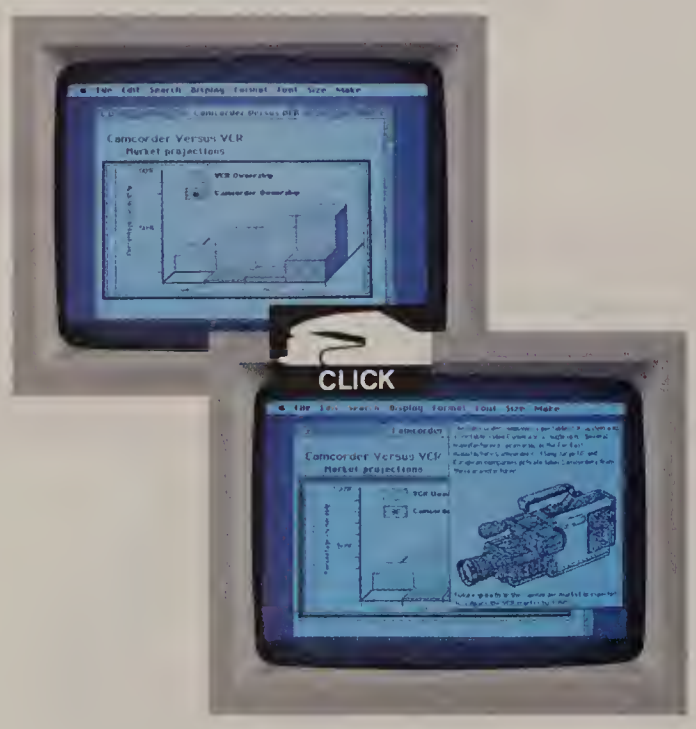

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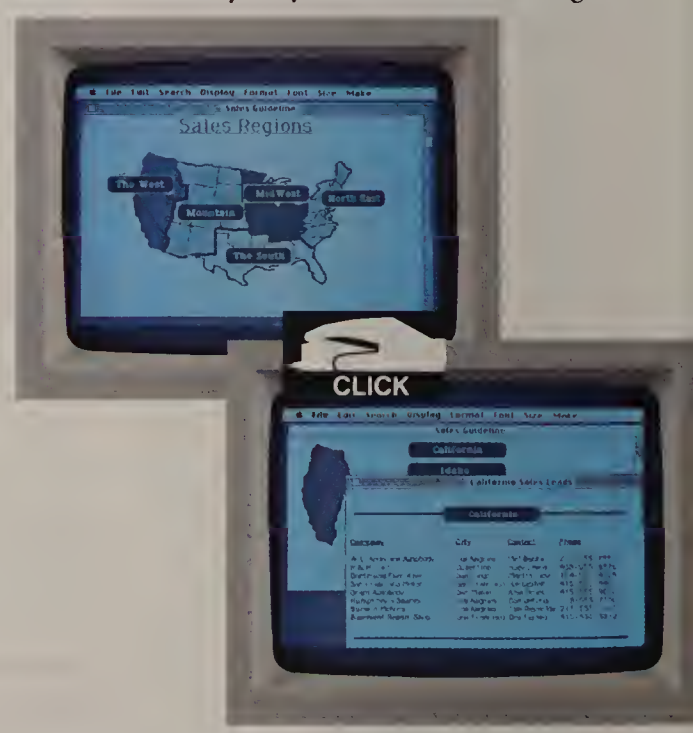

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Letters

A forum for Macworld readers

MERCEDES McDONALD

Words Count
I really appreciated Walter C. Burns's spelling checkers comparison in the July issue, but one item was missing from his inventory: which programs count the number of words in a document?

Donald J. Rogers
Schaumberg, Illinois

Of the products we included in the article, Hayden:Speller, MacGAS, MacSpell+, *and* Spellswell *provide word counts. Wolverine's* SpellCheck *also issues a word count. Incidentally, Assimilation, the publisher of* Mac Spell Right *and* The Right Word, *has gone out of business. –Ed.*

Corrections
The Willamette font ["Putting on a Good Face," July 1986] is available from Century Software.

The massive accounting comparison table in September's "Accounting Software Buyer's Guide" contained a few errors about Layered's Insight *series.* Insight*'s general ledger does have budgeting capabilities and has 16 predefined reports; the general ledger and accounting modules do cash accounting as well as accrual accounting. Layered maintains a toll-free support number for registered owners, and each program in the package has on-line help. The list price is $595 per module.*

Stat80, *mentioned in "The Labtop Macintosh" in the October issue, is available from Statware at P.O. Box 510881, Salt Lake City, UT 84151, 801/521-9309.*

Centram, maker of TOPS, *mentioned in "A Network Divided" in the October issue, has a new address and new toll-free telephone numbers: Centram, 2560 Ninth St., Berkeley, CA 94710, 800/222-TOPS, 800/445-TOPS in California.*

Desktop Typos
It's odd that you're pushing desktop publishing but neglect to mention it in your spelling checker article ["Letter-Perfect Documents," July 1986]. Very few spelling checkers can handle contractions like the word *can't,* because the checkers use the neuter apostrophe (') rather than the typographer's curly apostrophe (’). *Spellswell* does recognize the curly apostrophe, but I'm pretty sure the others don't. Unfortunately, *Spellswell* doesn't work with the best Macintosh word processor, *MacWrite* 2.2.

David Dunham
Goleta, California

According to DataPak Software, Liberty Spell II, *the successor to its* Liberty SpellChecker, *recognizes the curly apostrophe. And you can add contractions containing the special apostrophe to the dictionary of* Hayden:Speller. *–Ed.*

Another Spelling Checker
I was disappointed that you left our program out of your July article on spelling checkers. *SpellCheck* 1.3, which works with *MacWrite* 2.2 and text files, is available from many user groups or from us for $10.

SpellCheck version 2.3, available from us for $25, also works with *MacWrite* version 4.5 and *Microsoft Word.*

Gregory A. Ribar
President
Wolverine Software
8200 Ridgepointe
Burr Ridge, Illinois 60521

We had a prerelease version of SpellCheck *that we thought unfair to compare with finished versions of other programs. We tried to obtain a later edition, but it didn't arrive in time to include. –Ed.*

Checking the Checkers
I was intrigued by the promise of your eight-way spelling checker comparison but disappointed with the shallow treatment. An unanswered question is whether the programs limit the number of words that can be checked. *Hayden:Speller* chokes up at about 3500 words, for instance. And

(continues)

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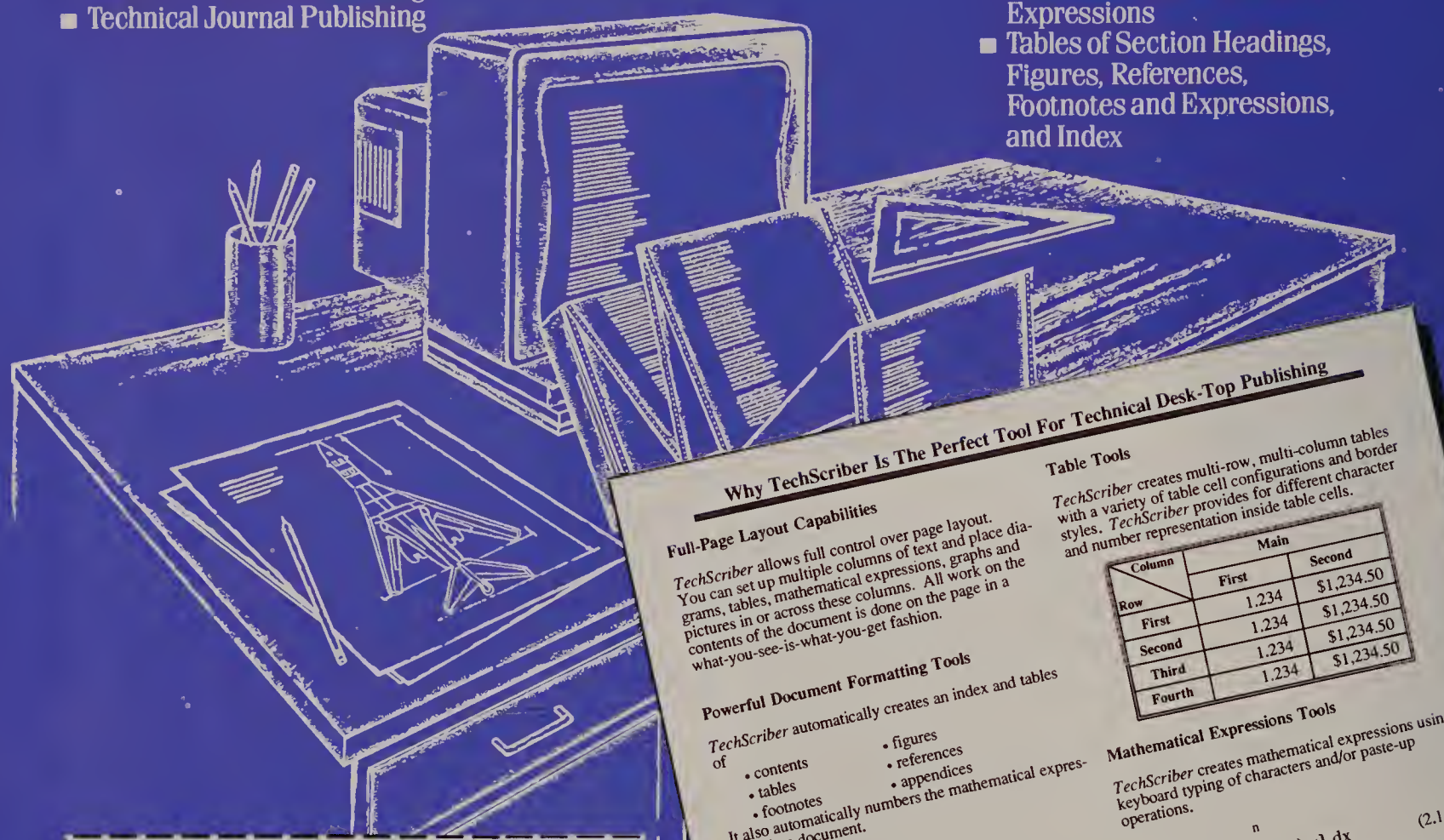

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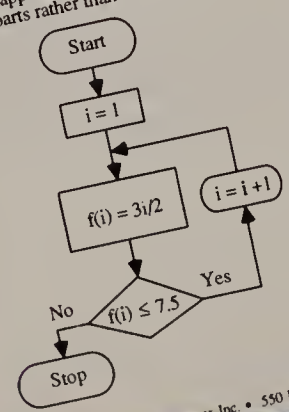

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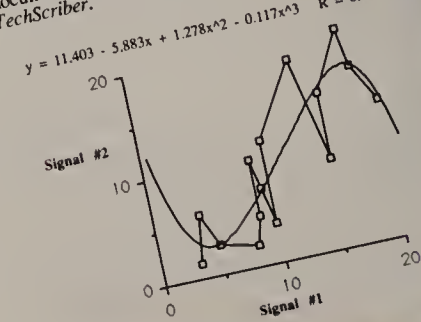

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please mention if a program is copy protected, as that might influence a decision to buy.

Also, thanks for the review of *Executive Office* ["A New Angle on Integration," July 1986]. I was involved with the beta test, and I think Gordon McComb is right on the mark.

Douglas G. Miles
Ellensberg, Washington

We now mention copy protection along with product reviews and in the entries in Where to Buy. *The question of maximum document length is difficult to answer because it depends on available disk or memory space. Generally you can expect longer documents to take longer to check, but we did not compare the performance of each product for book-length documents versus memos or correspondence.—Ed.*

Mutual Support

I have been reading with sympathy and despair about the plight of software consumers in search of technical support. My own story has a happy ending.

Even though I must have spent 8 hours on the phone with the people at Infosphere working out my hardware incompatibility problems and their new product bugs, Michael McGreevy, the support person, was always cool, called back when he said he would, never left me hanging in midair, pursued solutions by checking with other vendors when appropriate, and even called me after my system was up and running to make sure that all was well. I have never experienced better support; I was treated with dignity and professionalism.

My work includes running a 1300-seat auditorium. I learned the hard way that many tickets are sold (or not) because of the attitude of our box office personnel. When ours had a bad day, I could see it in the receipts. These people are the front lines in the marketplace. When they are good, it makes all the difference in the world.

Philip Morris
Jamestown, New York

Desktop Cheerleading

The software available for desktop engineering (see "Desktop Engineering," *Macworld,* September 1986) is still in its infancy. More features are desperately needed to allow desktop engineering to take hold in manufacturing. For instance, managing information on drawings and creating bills of material for manufacturing control are needed where I work, as is the ability to share information for scheduling and inventory control. There are dedicated systems out there, but I believe the Mac can be a cost-effective alternative if the right software is available.

Gerald Lenski
Odessa, Texas

Fussy Buyers

I was impressed by Brian Hines's October letter about Aldus replacing buggy Apple system software, gratis. Microsoft won't do that even for its own products.

I purchased *Multiplan* version 1.0 for my 512K Mac. When I kept getting computer codes instead of totals, I called Microsoft technical support—which, incidentally, is not a toll-free number. I was told that software bugs made many 1.0 versions incompatible with 512Ks. But, for an additional $25, they would send me version 1.1, which would function properly. I now shy away from Microsoft products. Why

Infocom introduces four new gam

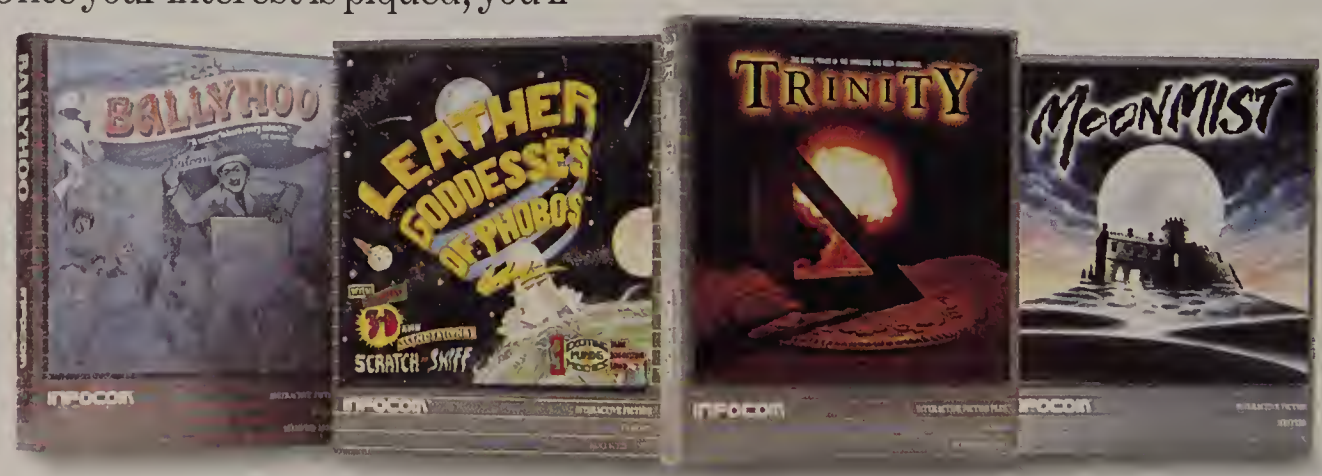
Infocom,™ the crazy people who brought you "Zork"® and "The Hitchhiker's Guide to the Galaxy,"™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: "Leather Goddesses of Phobos."™ It has a scratch n' sniff card and a 3-d comic book to excite all your senses. Once your interest is piqued, you'll embark on a rowdy romp through the solar system. This hilarious spoof of 1930's pulp science fiction has 3 "naughtiness levels," for the prude to the lewd. "Leather Goddesses" is sure to amuse members of either sex.

One's really warped.

Then there's "Trinity."™ It answers the question of whether a game can be both light-hearted and profound. You journey through a time warp into a mischievous fantasy world where all atomic explosions are mysteriously connected. "Trinity" takes you back to the dawn of the atomic age and puts the course of history in your hands.

One's a real circus.

It has been said that the circus is the only really mysterious thing left in civilization. One thing's for sure, there is plenty of mystery in "Ballyhoo."™ While trying to locate the circus owner's kidnapped daughter, you are somersaulted into a three-ring world of deception and crime. To solve the crime and save your hide from a permanent spot



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buy from a company that hits you over the head with a surcharge if you happen to be fussy enough to want a program that works?

Carol Fisher
Santa Rosa, California

How to Excel in Business

If Microsoft spent half as much effort on service as it does on that ridiculous copy protection, the company would profit by it. However, despite its neglect of individual customers, Microsoft makes the best software package I have ever seen: *Excel.*

Joe T. Briscoe
Santa Fe, New Mexico

Unfortunately, copy protection is not nearly as labor intensive as support is, otherwise you might have hopes of receiving improved service now that Microsoft has reversed its copy-protection policy for Mac products.—Ed.

Putting Magic in Medicine

We were happy to see *Slide Show Magician* receive the credit it deserves in the August 1986 *Macware Reviews.* For the past year we have used the program to develop a test used in environmental and occupational neurotoxicology for assessing brain function in people suspected of being affected by toxic agents. We present the patients with pairs of icons—some from Magnum's *MacPick,* others designed in *MacPaint*—that have a meaningful relationship, such as a man and a woman, and pairs of unrelated icons, such as a rose and a square. After repeated showings, we present one member of the pair and ask the subject to recall the missing icon.

The specialized computer-assisted psychological testing procedures currently available require further development by and support from expert programmers. On the other hand, *The Slide Show Magician* virtually transforms the Macintosh into a *tachistoscope,* a fundamental tool in experimental psychology. And we don't have to rely on computer programmers to make every modification of the show.

Jose A. Valciukas, Ph.D.
Annie Hernandez, M.A.
Department of Community Medicine
Mount Sinai School of Medicine
New York, New York

Drive a Horse

I enjoyed Jerry Borrell's editorial in the September *Macworld,* but he said a couple of things I found hard to swallow. First, he defined UNIX as an advanced operating system, but its "arcane syntax" is the sort of thing we're trying to leave behind. Using the Macintosh to make UNIX easier to use is like fitting power steering onto a Model T—for the same price, we could have a new car. Second, he asserts that the Mac can occupy the middle ground between the "mass-marketed offerings from Atari" and the IBM, Sun, and Apollo machines. It's more likely that the middle ground will disappear, and the Mac with it. Just because the Ataris are mass marketed doesn't mean they cannot become serious competition for the Mac. The Mac could find itself in the position of being neither the Model T nor the Rolls-Royce.

George Brims
Hilo, Hawaii

Compared to today's Finder and Mac system software, UNIX is an advanced operating system. Granted, the interface is not inviting, but wait for friendlier versions

es. One really smells.

Every package includes an integral set of props to excite your senses and enhance the game.

in the freak show, you'll need to stretch your puzzle-solving skills to the limit.

One's really haunting.

Wrapping up this new quartet is a classic gothic mystery set in a haunted castle on the mist-shrouded seacoast of Cornwall. In "Moonmist"™ you'll explore the darkest reaches of Tresyllian Castle and get involved with an eccentric cast of characters, including British nobility, while trying to save your best friend from a vengeful ghost. "Moonmist" offers four distinctly different sets of clues, problems, solutions and hidden treasures. So you'll die to replay it again and again.

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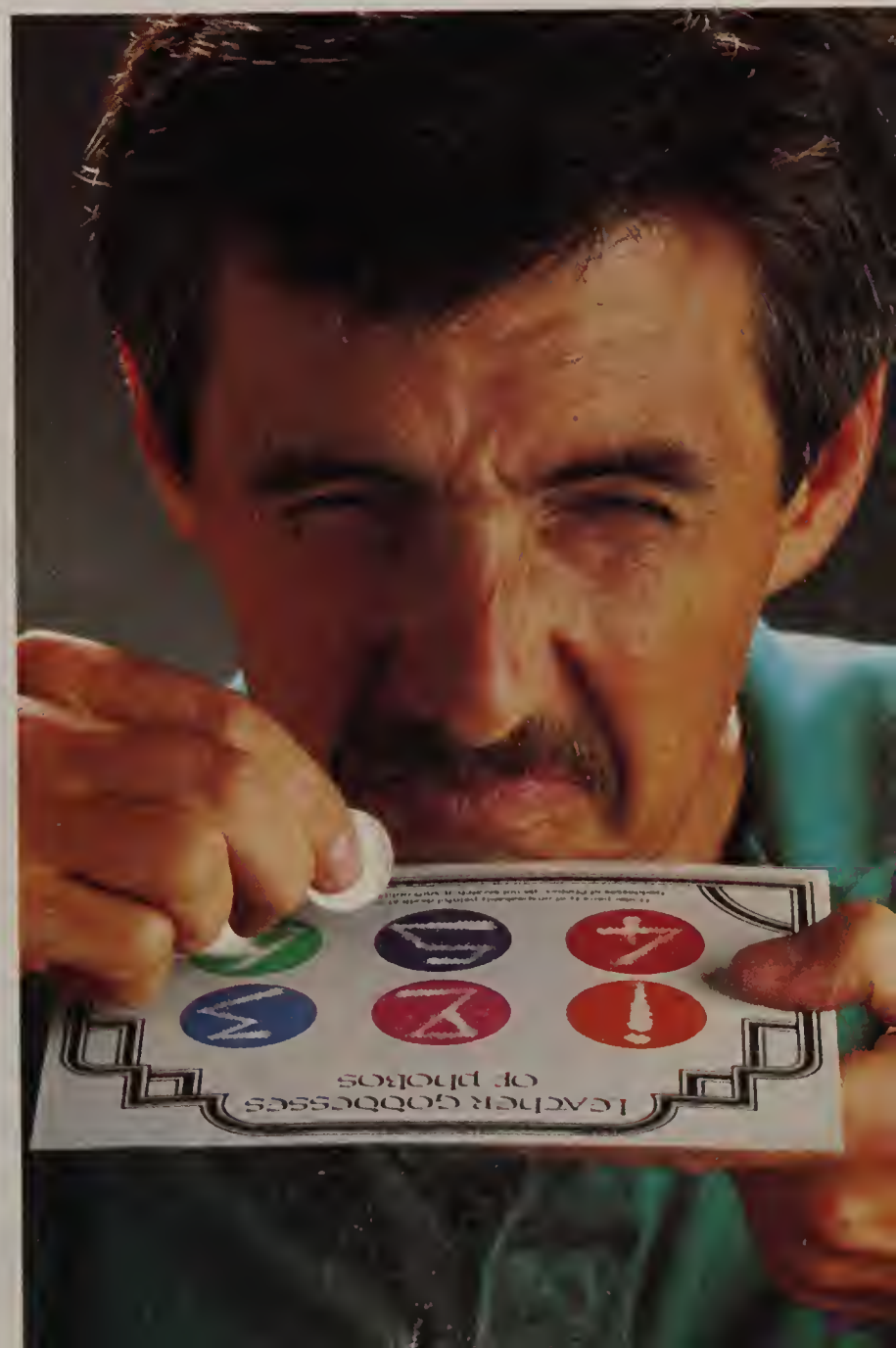
Circle 43 on reader service card



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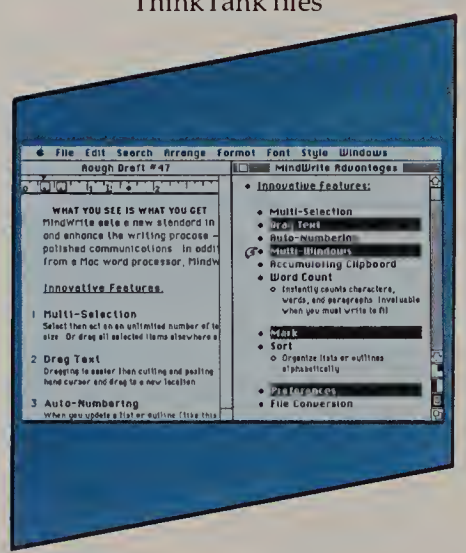

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Put MindWrite to work and write more creatively and effectively.
Requires 512K or Mac Plus w/ one 800K Internal Drive or two 400K Drives

ICON SELECT REVIEW

Big Mack Twinpack

From Western Computer **$1599**

The Big Mack Twinpack gives you two SCSI peripherals — a 20-meg hard disk that autoboots your Mac Plus, and a tape drive for making backups of your data — built into a molded plastic case much like the Mac's. Putting them both in one package eliminates the compatibility problems often encountered when setting up a system. The fast hard disk (65 ms average access time, 1-to-1 sector interleave) means you get quick response for programs that use lots of data. And, a special buffering scheme gives you a tape drive that can back up the entire disk in just six minutes (it uses built-in error detection that won't let you store bad data), so keeping data safe isn't a chore. A daisychain port is provided so you can connect other SCSI peripherals to your Mac; and, you can set the SCSI unit address from the outside, without having to open the case. *Requires Mac Plus; SCSI cable & backup tape included; comes w/maufacturer's 1-year unconditional guarantee*

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From Thunderware

Icon Review

MacBottom 20

From PCPC

The MacBottom SCSI is fast, giving you 20 megs of storage and nearly instant access to all your applications and files. It's fast, quiet, and reliable. And it's the only SCSI drive that offers a resizable print spooler. Both the serial and SCSI drives feature advanced utility software for fast backup to floppies. And you can re-

size volumes and mount them as needed from a desk accessory.

MacBottom Serial $899

MacBottom SCSI $899

Fanny Mac

From Beck-Tech $79

Why risk early failure by letting your Mac overheat

when it's so easy and inexpensive to install Fanny Mac? Fanny Mac reduces the operating temperature of your Mac as much as 50° Fanny Mac fits almost invisibly into your Mac's handle, installing in seconds without tools. And surge suppres-sion for your Mac is built right in.

Add Fanny Mac to your system to prolong the life of your Mac, help it run more efficiently, and protect your data.

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From Target Software $53

Only MacLightning watches your keystrokes and beeps when you mis-spell a word; or, work in silence and use MacLightning later to check selected text or an entire document. Installed as a desk accessory, it works in MacWrite, MS-Word, Jazz, ReadySetGo, and others. Expand MacLightning with a supplement "library". *Requires 512K & 2 drives or Mac Plus*

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Legal Dictionary	$53
Medical Dictionary	

Libraries require MacLightning

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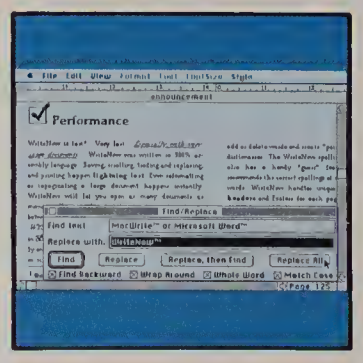

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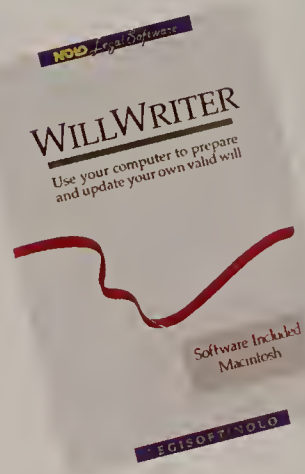

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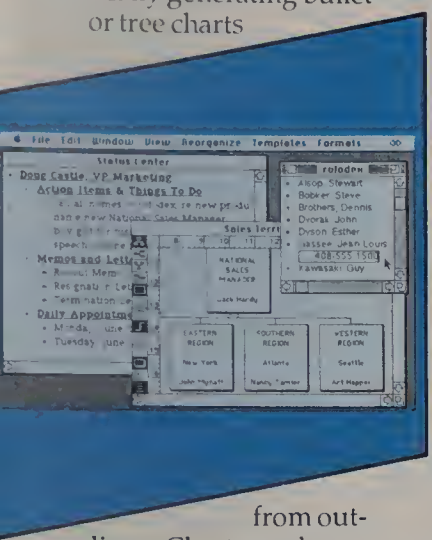

from outlines. Charts can be printed on paper or as transparencies for instant overhead slides. Outlining tools and installable templates make managing ideas a snap.

Cricket Graph

From Cricket Software **$129**

This powerful presentation graphics package for business and science supports 12 graph types! Display multiple windows and import data from almost anywhere via text or SYLK files. Select a graph from the menu for an instant data graph, or open an empty frame for a text graph. Enhance frames with text, rectangles, arrows, and 3D. Move graphs to MacDraw with objects pregrouped. Save graph formats without data to speed chart updates.

Electric Checkbook

From State of the Art **$29**

Electric Checkbook is a personal financial manager that handles up to five bank accounts on a 128K Mac or ten on a 512K. Define categories for income, expenses, assets, and liabilities. Reconcile bank statements and checkbooks, calculate profit and loss, and determine net worth. Electric Checkbook yields maximum results with minimum fuss. At this special low price, checkbook automation is within everyone's reach!

Tempo

From Affinity Microsystems

$59

Tempo saves you time by automating repetitive operations that are tedious

or time-consuming. It allows you to enter a series of text or commands with a single keystroke. Install Tempo and it appears on the Menu bar of every program you run. Tempo macros pause for input, let you create dialog boxes, and run by themselves at stated intervals. Order today and you'll soon be reaping the time-saving benefits Tempo offers!

Mirror 800K Drive

From Mirror Technologies

$229

Double your floppy storage and access data 50% faster by upgrading to a double-sided, 800K floppy drive. The Mirror Magnum 800K external floppy drive reads and writes both double-sided and single-sided disks. Compatible with both

the old file system and new HFS from Apple. A super bargain as well! *Requires 512K or Mac Plus; has a 1-year manufacturer's warranty*

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Broderbund
Ancient Art of War — *SPECIAL* $27
Knights, Archers, Cowboys, Indians and more!
PrintShop — *NEW* $53

Davidson & Assoc
Speed Reader II — $49

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First Shapes — *NEW* $32
KidTalk — $39
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SmoothTalker — $49
Speller Bee — $39

Great Wave
KidsTime — $29

Infinity
Grand Slam Tennis — $27
Requires 512K or Mac Plus

Microsoft
Flight Simulator — *SPECIAL* $32

Mindscape
Balance of Power — $30
ComicWorks — $49
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MacGolf — *SPECIAL* $36
Requires 512K or Mac Plus

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Typing Made Easy — $36

Qware, Inc.
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Dinner at Eight — *SPECIAL* $32
Silver Palate Collection — $29
Requires Dinner at Eight

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Dark Castle — $29
World Builder — *NEW* $45

Spectrum Holobyte
Orbiter — *SPECIAL* $27

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Cuesta
Datasaver—90 watt — *SPECIAL* $279
Datasaver—200 watt — $399
Datasaver—400 watt — $529
Protection from power blackouts

Dayna
MacCharlie Plus 256K Single Drive — *NEW* $699
MacCharlie Plus 640K Dual Drive — *NEW* $799
Runs IBM software on Mac

Ergotron
MacBuffer 256K — $259
MacBuffer 512K — $389
MacBuffer 1024K (1MB) — $569
Save time while printing on ImageWriter

Hayes
Transet 1000—128K — $299
Transet 1000—512K — $399
Transet 1000 Accessory Kit — $29

Koala
MacVision — $175

MacMemory, Inc.
MaxPlus — *SPECIAL* $349
—Upgrade your Mac Plus memory to 2 meg. Plugs into standard SIMM sockets; includes Max Chill fan, Max RAM/MaxPrint. Requires installation by technician.

Radius
Radius Full Page Display — $1995
Large screen monitor displays an 8-1/2" x 11" page at actual size

R.H. Electronics
Mac 'N Frost — $65

Summagraphics
MacTablet—6"x9" — $329
MacTablet—12"x12" — $449
Precision drawing and tracing

Thunderware
ThunderScan — $189
ThunderScan Adapter Kit — *SPECIAL* $63
Adapter and cables for Mac Plus
ThunderScan Plus Bundle — $249
Includes ThunderScan and Adapter Kit

Disk Drives

AST
AST 2000 — $2195
20 Meg Winchester; 20 meg tape backup
AST 4000 — $4900
74 Meg Winchester; 60 meg tape backup

Ehman Engineering
800K External — *SPECIAL* $229
20 Meg SCSI — *NEW* $849

Iomega
Bernoulli Box for Mac Plus
- 10 Meg SCSI Drive — *SPECIAL* $1399
- 10+10 Dual SCSI Drive — *SPECIAL* $1995
- 20 Meg SCSI Drive — $1890
- 20+20 Dual SCSI Drive — $2699

Cartridges
- 10 Meg (3 Pack) — *SPECIAL* $155
- 20 Meg (3 Pack) — *SPECIAL* $199

Cleaning Kit — $75

SPECIAL PURCHASE!
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For Mac Plus
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Replaces AppleTalk connectors

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Smartmodem Bundle — $449
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Bernoulli Boxes

From Iomega

Bernoulli Boxes for Mac Plus are fast, reliable, and cost-effective mass-storage solutions. Features include auto-boot, HFS support, and daisy-chaining with other SCSI devices. Average access time is 35 ms, with a data transfer rate of 1.13 megs/sec. The unlimited data storage, efficient backup, and maximum flexibility provided by 10- or 20-meg removable data cartridges put the Bernoulli Boxes in a class by themselves.

All Require Mac Plus

Single-Cartridge Drives
- 10 Meg **$1399**
- 20 Meg **$1899**

Dual-Cartridge
- 10 + 10 **$1995**
- 20 + 20 **$2699**

10-Meg Cartridges (3pk) $ 155
20-Meg Cartridges (3pk) $199
Cleaning Kit $ 75

Circle 272 on reader service card

to appear before judging UNIX to be a thing of the past. On the second point, time will tell.—Ed.

Shrink-to-Fit Scans?
After using ThunderScan to digitize floor plans, I noticed some horizontal image compression. Tests revealed 15 percent shrinkage horizontally but none vertically. The shrinkage is not noticeable in complex images, but it stands out in drawings, maps, and floor layouts. The scanner works fine otherwise, but the problem limits its usefulness.

James Makris
Norfolk, Virginia

Thunderware offers a fix: select Tall Adjusted in the Page Setup dialog box to correct the proportionality problem.—Ed.

MacAuthor, MacAuthor
When you reported on word processing software in the July *Macworld View,* you may have left the impression that *MacAuthor* is for people who write memos and books. Actually, it's authoring software for creating courseware on the Mac. *MacAuthor* was developed by EduDisc and has been distributed to educators and trainers throughout the United States.

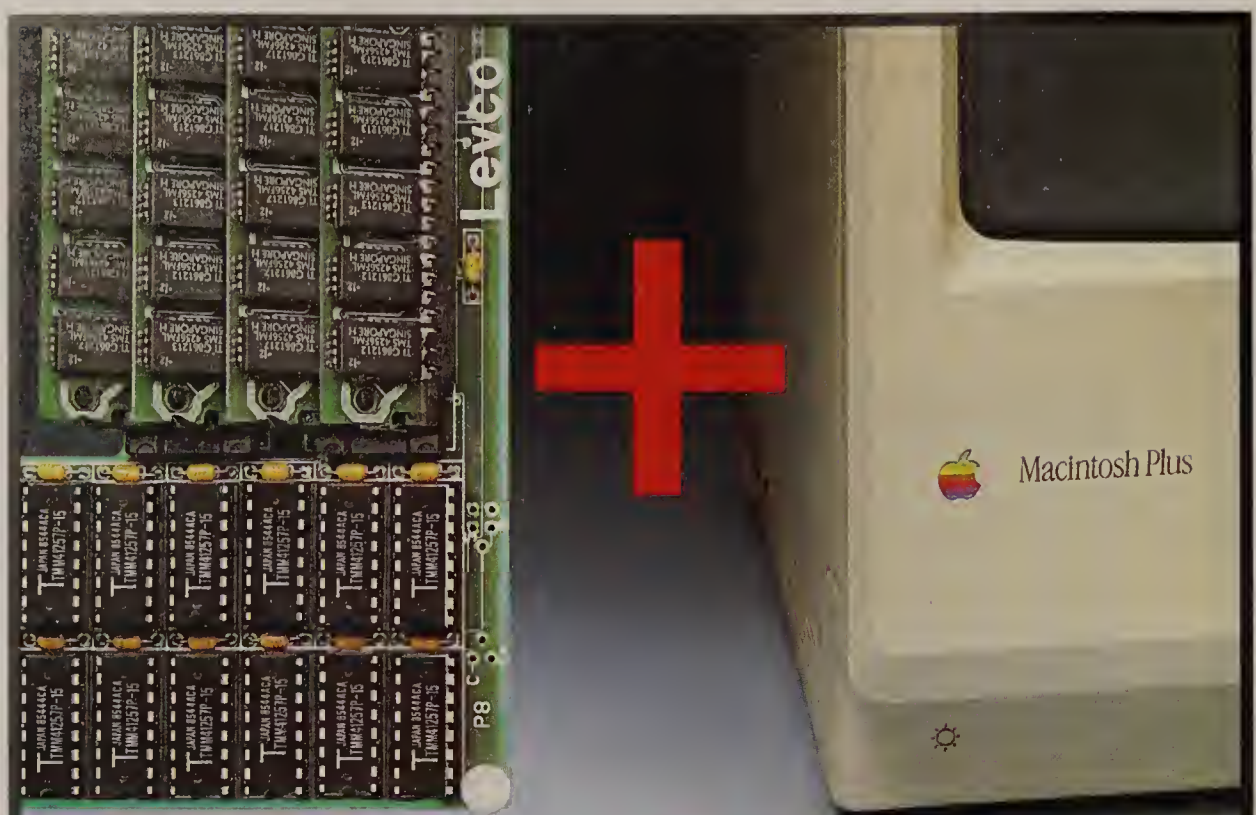
Lynda J. Moore
EduDisc
Nashville, Tennessee

A Word about Brother Printers
C. Claude Dawson II wrote in your September issue that his Mac routinely bombs when he attempts to use his Brother letter-quality printer. I recently went through the same ordeal with *Microsoft Word* and my Brother HR 15 XL.

To avoid the problem, you have to make sure that Dover-8, Dover-10, Dover-12, and Dover-12 PS are on the system disk. *Word* uses these fonts as the screen display and will bomb if they are not present. The fonts are included on the *Word* master program disk.

J. B. "Brad" Alberts
Cardiff by the Sea, California

Tempo Clashes with Smart Alarms
I am writing to advise readers of a bug that occurs when you install two programs together that work very well by themselves, *Tempo* and *Smart Alarms.* Our law office installed *Tempo* on all our Macintoshes. After we added *Smart Alarms,* the Macs began to crash regularly. At least once a day, my *Microsoft File* crashes while I insert a new alarm reminder. Both programs



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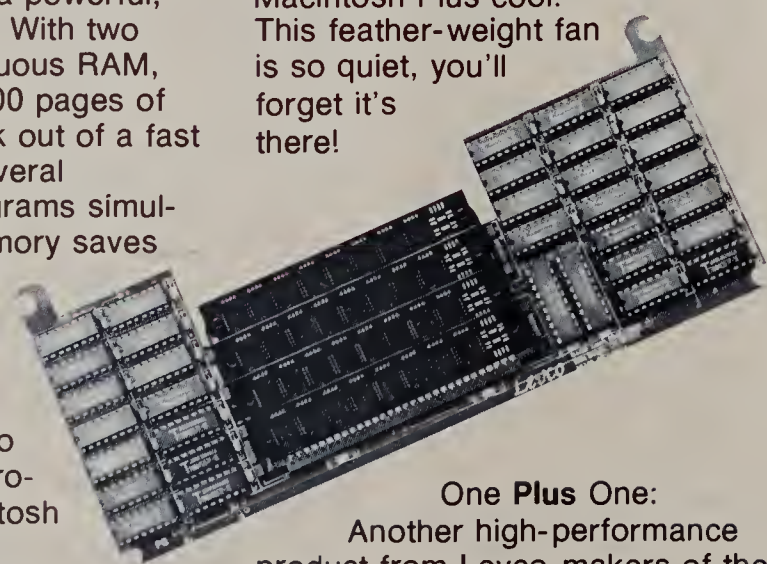
Doubles the Memory of Your Macintosh Plus™

Make the most of your Macintosh Plus now! Levco's One **Plus** One memory upgrade transforms your Macintosh Plus into a powerful, efficient workstation. With two megabytes of contiguous RAM, you can hold over 400 pages of text in memory, work out of a fast RAM Disk or use several memory-hungry programs simultaneously. More memory saves you more time!

Easy Installation
Just plug the One **Plus** One module into the SIMM sockets provided on your Macintosh Plus motherboard. No soldering or special equipment is required!

Compatibility Plus
The One **Plus** One makes the most of the current Macintosh system, standard applications and fast SCSI drives without the handicap of "boot" or "configuration" software.

Quiet Cooling Included
Levco's MacBreeze™ piezoelectric fan is included to keep your Macintosh Plus cool. This feather-weight fan is so quiet, you'll forget it's there!



One **Plus** One: Another high-performance product from Levco, makers of the MonsterMac™, Prodigy 4™ and *OverDrive*™.

Levco
6160 Lusk Blvd.
Suite C-203
San Diego, CA 92121
(619) 457-2011

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W·O·R·D HANDLER

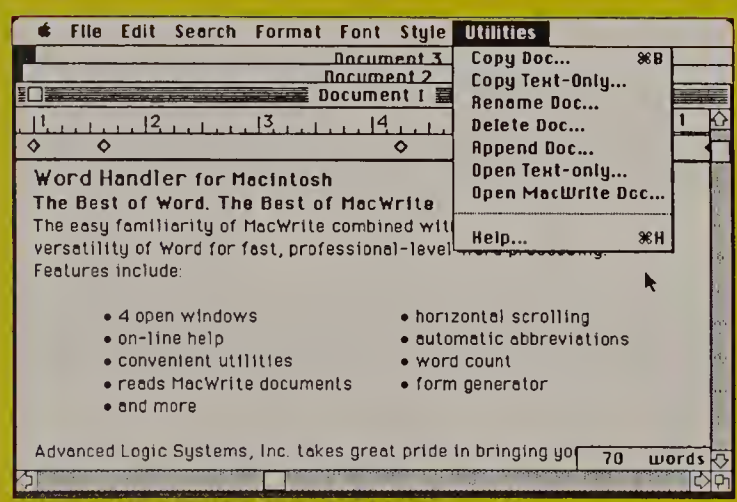
Word Processing for the Macintosh™

POWER

Word Handler.™ is a powerful, full-function word processor for the 512K Mac and beyond.

- Open up to four documents simultaneously to cut and paste text between documents or refer to one document while you work on another.
- Full functioning Ruler supports paragraph indentation, margin changes and regular and decimal tabs.
- Fill-in feature for personalized form letters and documents.
- Change case of headings and titles without retyping text.
- Mirror-image printing for bound documents.
- Word Count lets you know how much you've typed.

The Best of Word™ The Best of MacWrite™ for only $79.95



Compare our features then compare our price. We're sure you'll agree that Word Handler is the best word-processing value available today.

EASE OF USE

Word Handler's pull-down menus and dialog boxes take full advantage of the user-friendly Macintosh environment.

- Horizontal scrolling makes it easy to view and edit a document larger than the window.
- Use the convenient Utilities menu (shown at left) for a quick and easy way to rename, delete, copy documents and more.
- Store frequently used words and phrases with Word Handler's Abbreviation facility to avoid repetitive typing.
- Open fully-formatted MacWrite documents.
- Advanced scrolling options.
- Help is always available at a touch of the mouse.

Special Trade-In Offer for MacWrite Owners:

For a limited time*, you can get Word Handler direct from ALS for the astoundingly low price of **$29.95!**

Just put your original MacWrite master disk in an envelope along with the coupon from this ad and your check for $29.95 and send it to Advanced Logic Systems, Attention: ALS Word Handler Offer.

You be the judge. If you don't agree that Word Handler is better than MacWrite, just send us a note within 30 days of purchase and we will send you a replacement MacWrite disk for a postage and handling fee of $25.

*Offer may be withdrawn at any time.

YES! Please send me Word Handler for the Macintosh.

☐ I want Word Handler but do not want to trade-in my MacWrite disk. Enclosed is $79.95.

☐ Enclosed is my original MacWrite disk and $29.95.

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Circle one: MasterCard Visa American Express Check

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EAGLES DON'T FLOCK

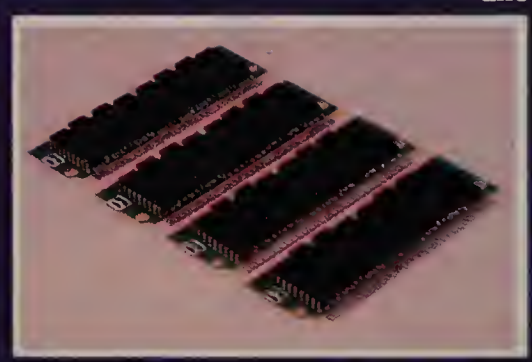
They stand alone. So does MacSnap Plus 4 from DOVE COMPUTER. MacSnap Plus 4 utilizes 'state-of-the-art' 1 Megabit chips to give the Macintosh Plus user a full four megabytes of contiguous RAM, **NOW**! And with our performance software package you can work up to 60% faster. MacSnap Plus 4 offers maximum memory enhancement and productivity for the corporate, business or professional user. And MacSnap Plus 4 actually lowers the Mac's power draw, so you can have peace of mind. Less heat. More memory. NO fan required.

Of course the Plus 4 is fully compatible with the Macintosh's operating system and all system software, but it doesn't stop there. It is also compatible with HyperDrive and other internal hard disks. And it comes complete with its own performance software package that includes a user-configurable RAMdisk, Apple Switcher and a print spooler. Now you can run those normally slow programs like Excel, Jazz and Pagemaker at lightning speed. Or manage them simultaneously with only a single disk drive. The ideal desktop publishing companion, our print spooler allows you to print one document while working on another. And with all that extra speed and memory, deadline worries are a thing of the past.

If you're not ready for 4 Megs you can start with 2 Megs and expand later. DOVE offers you a choice of 2 Meg products designed to double the memory and increase the performance of your Plus. MacSnap Plus 2 is perfect for the business or personal Plus user who has no need for further memory expansion. MacSnap Plus 2 provides a full 2 Megs of contiguous memory with the same speed and productivity benefits as the Plus 4, but in a very cost effective package. For greater versatility and expandability, try MacSnap Plus 2H. The Plus 2H uses 1 Megabit chips and SIMM technology to give you 2-2.5 Megs. And you have the option to expand the Plus 2H to 4.0 Megs as your needs change. MacSnap Plus 2H is completely compatible with HyperDrive and other internal hard disks.

DOVE's Plus products offer you top quality, performance and a choice based on your needs. All supported with complete user documentation and DOVE's full warranty and product guarantee.

Don't wait. Call us for the name of your local DOVE dealer. Or visit your dealer and ask for our products. Go ahead. Soar like an eagle — with MacSnap Plus.



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For those who didn't place first in the Spelling Bee...

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You bought Microsoft® Works to save time and unnecessary effort. So, let WorksPlus Spell track words for your Works!

WorksPlus Spell is the fastest spelling checker on the market—***10 times faster*** than any other. Spell checks a two-page memo in 1 second; a 50-page proposal in less than 30 seconds!

Ever have trouble remembering the spelling exceptions? *"I before e..."*??? Spell doesn't. It knows all those endless rules as well as verb tenses, plurals, adjectives, and adverbs.

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Spell can also check each word as you type without slowing your speed. A gentle beep warns you of a misspelling or typo. Just choose the correct alternative and continue typing!

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But Spell is more than a spelling checker. Its Glossary feature saves you typing the same phrases over and over. Just abbreviate those frequently-used phrases. Spell will automatically insert the complete phrase for you. You can also use its automatic hyphenation feature to give your documents a compact, professional appearance.

WorksPlus Spell is *the* spelling checker to use with your Macintosh™ and Microsoft Works program. Spell is so well integrated that even the Works Help file is updated to include it. Now you can write, check, and print a document ***without ever leaving*** the Works program.

We're so sure that you'll win every time you use Spell that we'll include a blue ribbon with your purchase! In addition, Spell comes with a 30-day money-back guarantee so you can't lose.

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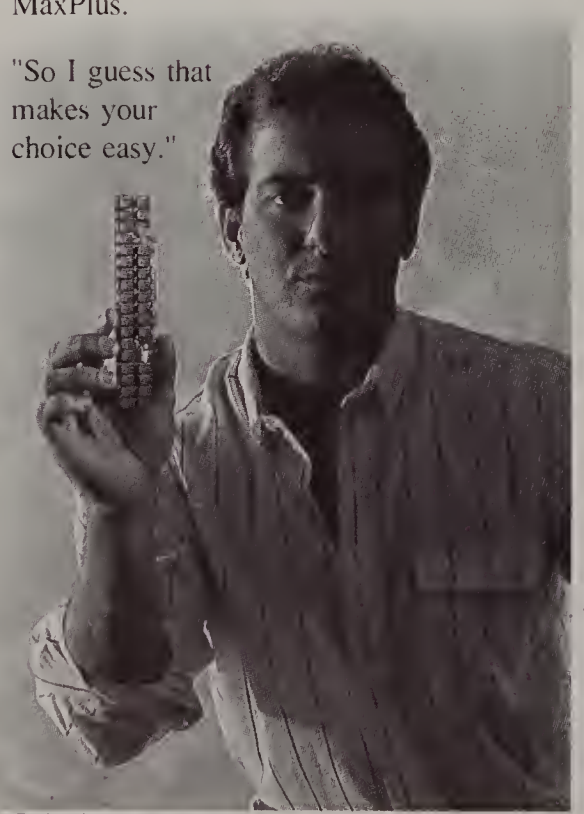
"Some choices are hard, some are easy.

"When we designed the MaxPlus™, we had a lot of hard choices to make. Engineering or economy. Just hardware or a complete system. Apple™ standard or not. We must have made the right choices, because the MaxPlus has become the best-selling Macintosh™ memory product ever.

"We decided to put our money into the same SIMM technology that Apple chose, so our boards would plug into the Macintosh Plus without modification — and still be expandable. With a two-year warranty. But hardware wasn't enough, so we included MaxRAM™ and MaxPrint™ RAM disk and print spooler software to put the memory to work. And we added the MaxChill™ piezo-electric fan, too, so the Macintosh Plus could actually be more reliable *with* the MaxPlus than without.

"The result is a complete system that will help you get your work done faster. Whether you use large memory-intensive programs, or need to run several programs fast, you'll be more productive with the MaxPlus.

"So I guess that makes your choice easy."



Carlos Suarez
President & Co-Founder

MaxPlus by
MacMemory
The Macintosh Performance Family
473 Macara Ave.,Sunnyvale, CA 94086 •
(800)862-2636, (408)773-9922 in California

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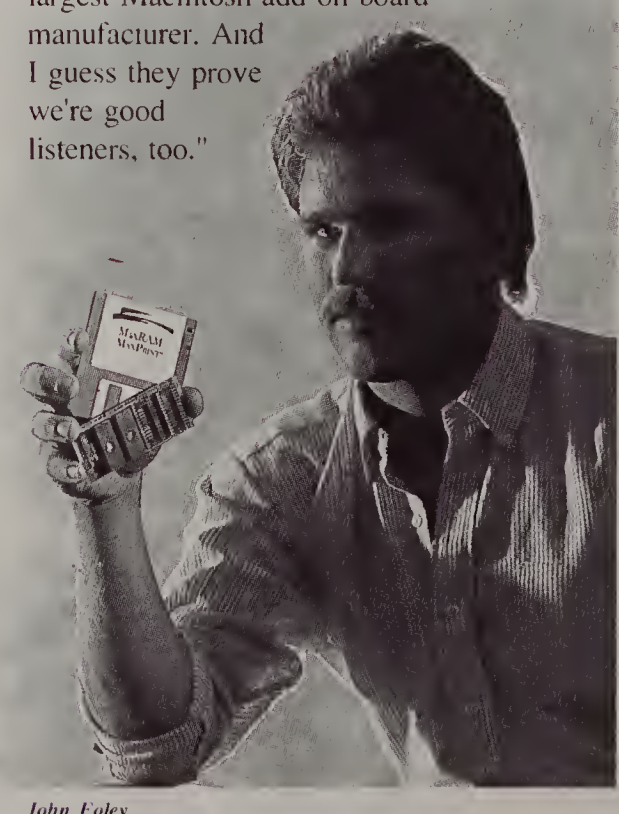
"Our users tell us what we want to know. So we listen to them.

"Here's an example. Our MaxRAM™ and MaxPrint™ became the world's best-selling RAM disk and print spooler software, because they let users work 10 times faster than with a floppy and put an end to waiting for the ImageWriter. But RAM disks had a problem — one bomb and the data was gone. So when some people told us this was why they'd never use a RAM disk, we looked for a solution. Enter MaxSave™.

"MaxSave is the first and only internal recoverable RAM disk system for the Macintosh™ Plus.We combined hardware and software so our users could enjoy the speed without worrying about the crash. If and when the Macintosh bombs, they press reset and recover their data *intact*. Not bad for $119. And of course they get a full two-year warranty.

"So we wanted to pass that information along. After all, it's solutions like MaxSave that have made MacMemory the world's largest Macintosh add-on board manufacturer. And I guess they prove we're good listeners, too."



John Foley
Executive Vice President & Co-Founder

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are so good we hate to do without either, but they are incompatible, and we risk crashing and losing all the alarms preset in *Smart Alarms.*

Stewart H. Aron
Toledo, Ohio

Rick Barron, president of Affinity Software, confirms the conflict between the two desk accessories. The problem occurs, Barron says, because the two try to use the same part of the system heap in RAM. The publishers are working together to arrange a détente; look for updated software that won't cause problems.—Ed.

File under Forms

"Forms Following Function" in the June 1986 *Macworld* was very interesting and informative. However, one readily available program was left out. It is possible, though admittedly not easy, to create usable forms with *Microsoft File.* As you fill out the form, you enter information into a flexible database, and you can easily make a hard copy of your form, either blank or filled out. You can also do calculations on the information you enter. *File* accepts *MacPaint* graphics, so you can put in your logo. But the disadvantage is the time it takes to create even a simple form. The program runs slower and slower as more data fields are entered, and simple changes become agonizing. However, once the form is entered, it works just fine.

Daryl Harris
South Bend, Indiana

More Forms

Your articles on creating forms in June ("Forms Following Function") and August ("Document Construction Set") did not mention our program, *MacFill-In,* which is specifically designed for printing documents such as invoices, insurance forms, and personnel forms. It comes with a 30-day money-back guarantee and costs $39.

Robert T. Nicholson, President
Cognitive Concepts
1219 Phelps Ave.
San Jose, CA 95117

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"The Macintosh legacy has only just begun."

"You know, in the last two years, we've come up with a really impressive family of products for what was supposedly a closed machine."

"Right. And now Apple's coming out with an open architecture machine. The possibilities seem endless."

"I wish we could show people what we're developing right now."

"Now, not all our products are good looking. Take MaxChill™."

"Sure it's funny looking. But it's the best thing on the market for keeping the Macintosh™ cool. A cool Mac is a reliable Mac."

"And the best thing is that you don't even remember it's there. It's internal and it's quiet. You don't see it. You don't hear it."

"Remember how hard we worked on TheMax? It was our first memory product, and we wanted to make it right."

"Right. We even spent a lot of time deciding what color the resistors should be. But the engineering really stood out. Clean. Elegant."

"Don't forget reliable."

"We could have cut corners, I guess, but we were determined to produce the best possible product."

"We haven't changed that philosophy, either. The MaxPlus™ stands out in today's marketplace as a standard of fine engineering, fully compatible with Apple's standards."

"Sometimes the recommendations of our engineers are hard to take. They mean spending a little more time, a little more money. But in the long run, it's worth it."

"Then there's MaxPrint™ — a print spooler that works! No one could believe there *was* such a thing, let alone that we were *giving* it away with all our Max memory expansions."

"And you know, we're still doing that. But it has become so popular, we've made it available on its own. MaxPrint is selling bundled with MaxRAM™ — both programs for under $50.

"Maybe that's why it's the best-selling print spooler."

"Desktop publishing is a perfect example of the new generation of Macintosh applications that require more memory to really perform. With our memory products, it takes less time to complete a project."

"Actually, it's less *waiting* time — more *working* time."

"You can get a lot more accomplished."

"Customer support is easy when you have good products. It's easy, for instance, to offer a full two-year warranty on all our products. We've developed a philosophy of going out of our way to keep our customers happy."

"What it boils down to is that when you have a problem you want a solution."

"When we developed the MaxPlus, we knew we had the best 2Mb Macintosh Plus expansion possible."

"But we also knew that hardware was only part of the solution. So we made it into a whole hardware/software system. We included MaxRAM and MaxPrint software so the user could put that memory to work. And added the MaxChill."

"That means the Macintosh Plus could be more reliable *with* our product than without it."

"After all, what really matters here is performance."

Carlos Suarez
President & Co-Founder

Thomas Massie
Vice President of National Sales

John Foley
Executive Vice President & Co-Founder

MacMemory

The Macintosh Performance Family

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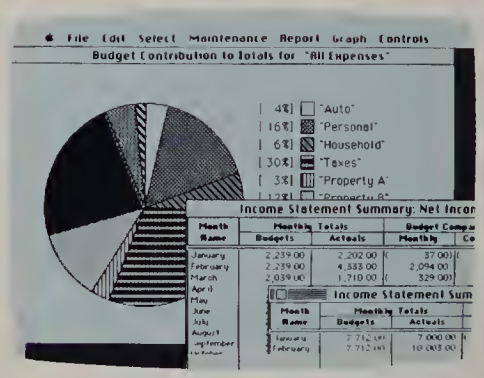
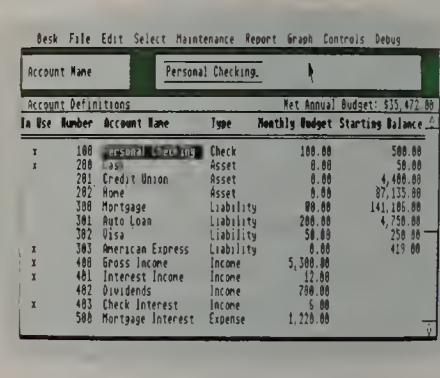


Analyzing your financial position with graphs and reports. (Version 1.4/ Macintosh™)

Using graphics to capture your complete financial picture. (Version 1.5/ Apple® II family)



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If, on the other hand, you seek software that can stand up to a small business, then the speed and automatic double-entry accounting that's built right in will give you a sense of power.

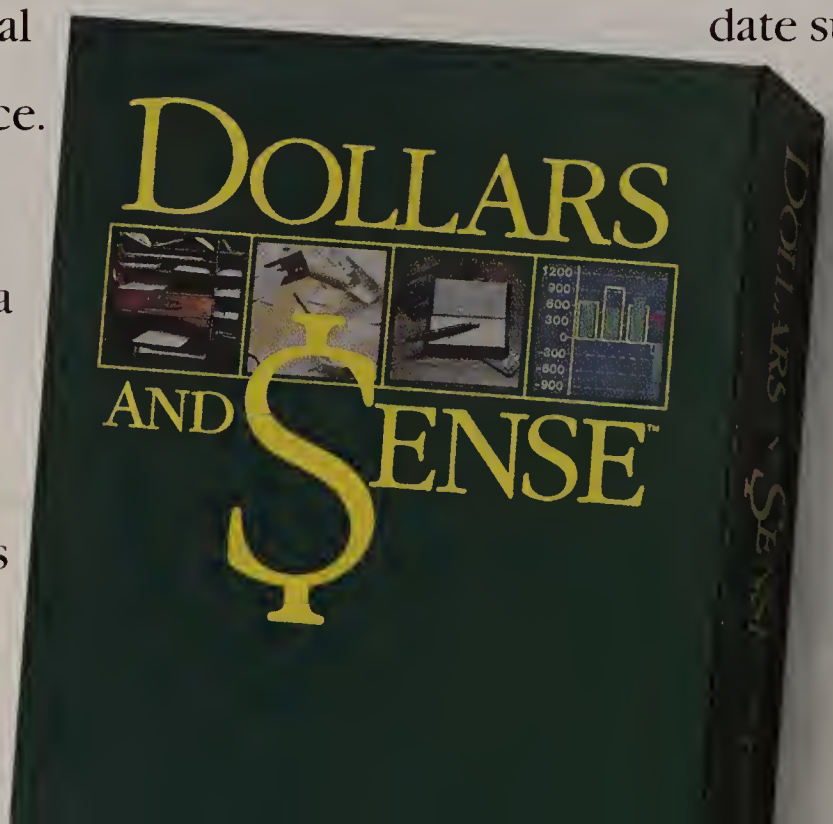
While the absence of copy protection will keep you from feeling frustrated.

Achieving instant gratification.

When it's time to examine your financial profile—at tax time or any time you're in the mood—a keystroke is all it takes to generate the kind of detailed self-analysis you see at the top of this page.

Income statements, balance sheets, year-to-date summaries, cash flow analyses and a variety of charts and graphs will bring you face-to-face with financial reality.

At which point, you may want to lie down.



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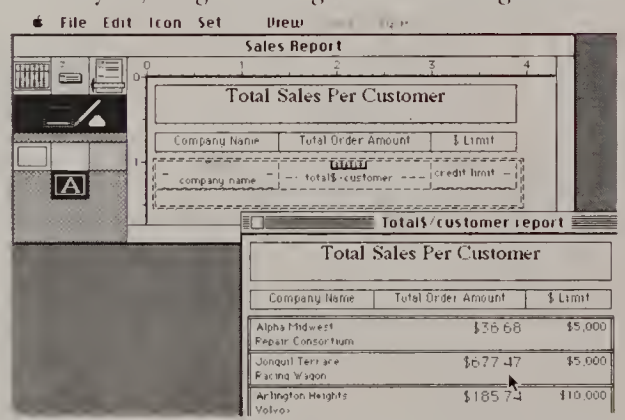
THE ONLY COMPLETE MULTIUSER SYSTEM FOR APPLETALK AND ANY HARD DISK

MultiUser Helix

MultiUser Helix is a shared data-based information management and decision support system that includes a complete application building environment. With MultiUser Helix you can design a system to run a business, office, or department and then share that system to coordinate the efforts of your people.

No programming necessary

Use icons and visual design tools to create all the vital input and report forms, lists, analyses, and mail merge letters needed to run your business. No need to learn a programming language, understand arcane command codes or special formulae. Visual building blocks let you quickly set up data-based calculations to take care of any business need: from order entry, inventory control and invoicing to sales analyses, budget tracking and asset management.



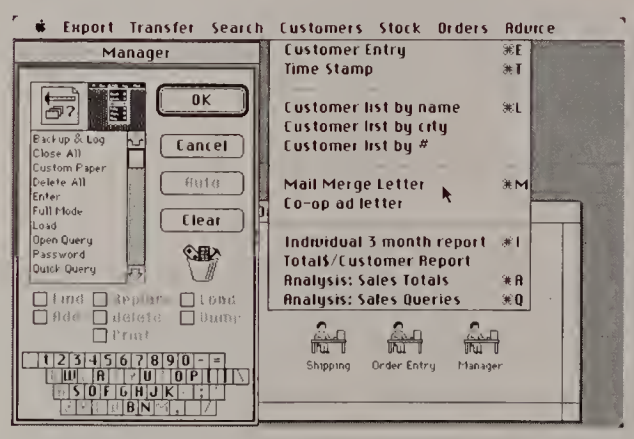
Design forms that reflect the way your business works — from mailing labels to entry forms to presentation-quality reports. All Macintosh fonts, styles and graphics capabilities are supported.

Everything built in

In MultiUser Helix, the multiuser capability — enabling more than one person to work with the same information base at the same time — is built into the software. All other systems require special hardware or extra software. They "force" a multiuser effect with programming tricks like "semaphores," and rely on external "fileservers" to simulate multiple access to files. This results in a complicated, inflexible, slower, and more expensive system. In MultiUser Helix, the whole network functions like a human nervous system, with its own updating and feedback mechanisms as a natural part of the system. There is no reliance on external hardware devices, and no need to worry about programming interlocks and special volume configurations.

A system everyone can share

Just connect your Macintosh computers with the AppleTalk network (the same cables that connect the Macintosh with the LaserWriter). MultiUser Helix automatically updates all screens and shows the current results of any changes made on the network. MultiUser Helix handles all network control, including record updating and record locking. Since everything is already built in, there is no need to worry about special fileserver hardware or software. Best of all, MultiUser Helix works with any hard disk.



Simply type your own menu names into the Macintosh menu bar and drag form names and commands into the menus. Then click user options and permissions on a per form basis before assigning keyboard controls which instantly open forms for entry, automatic reports and printing.

Expandable

This package contains 3 MultiUser Host/Guest disks, so that you can start with a 3 station network. Additional stations are available to a total of 31 per network.

Full support from Odesta

This MultiUser Helix package includes: 7 disks (2 Double Helix v.1+ program disks, System disk, Resource/Work disk with sample applications, 3 MultiUser Helix Host/Guest disks); 3 reference manuals, including a tutorial Quick Start guide, and an 18 ring project binder with notepad. To Odesta, your business is as important as our own: call us toll-free with technical questions or to inquire about our Consulting and Application Design Services.

Key Network Features

- Supports AppleTalk Network
- Compatible with any hard disk **(no fileserver required)**
- Expands up to 30 users per network
- Each user can have his or her own personalized menus and password that relates to that person's function
- Time stamping
- Automatic external data log file to ensure data integrity
- Automatic updating of any record or list — on screen
- Complete control of viewing, adding, deleting, changing, or printing information on a per form/per user basis
- Capability of having multiple "hosts" on one network simultaneously
- Can be used in conjunction with volume servers and file servers
- MultiUser Helix receives the same excellent support Odesta gives to the other members of the Helix family

Requirements

- Network host requires hard disk, and 1Mb memory is recommended.
- AppleTalk Network.
- Guest nodes work with the Macintosh Plus, 512E, or Macintosh 512 with external drive.

Odesta Corporation 4084 Commercial Avenue Northbrook, IL 60062 U.S.A.
800-323-5423 (In IL) 312-498-5615

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Peripheral Land, the SCSI Experts

*RANKED #1 IN SEPT. ISSUE OF *MacUser*

** THE PERIPHERAL LAND DISK SATIFIES BOTH THE PRICE-CONSCIOUS AND THE SECURITY -CONSCIOUS USER'

Macworld **Sept. Issue.**

* BACK-UP PROGRAM TO BACKUP THE HARD DISK TO FLOPPIES BY FILE, FOLDER, VOLUME, OR INCREMENTAL FILES.
* IT ALSO COMES WITH A COMPLETE SET OF FLEXIBLE UTILITIES TO FORMAT AND PARK THE DRIVE.
* ALL PERIPHERAL LAND HARD DISK DRIVES RUN AS A SINGLE HFS VOLUME, OR CAN SUPPORT HFS AND MFS VOLUMES SIMULTANEOUSLY WHEN FORMATTED.
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Say goodbye to floppies and hello to 22 megabyte tape cartridges The MacBack Plus can either back-up or restore 20 megabytes in minutes The back-up criteria can be selected by file, folder, volume, or incremental files The MacBack Plus is available in either 22 or 60 megabytes of awesome capacities

MacBack Plus 20/MacBack Plus 60

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High performance Series SCSI Hard Disk

The MacFast SCSI series is our top of the line hard disk for the ultimate Macintosh power user who demands speed from the hard disk What makes the MacFast hard disk superior? An 8k buffer used for caching that maximizes raw data transfer on the SCSI bus to its fullest potential A Turbo Stream intelligent disk/tape controller that has its own Zilog Z-8 micro processor with DMA that optimizes data transfer at a phenomenal 5 megabytes nonstop per minute between the MacFast disk and MacBack tape unit.

MacFast 20, Formatted/**MacFast 30** Formatted
MacFast 80, unformatted/**MacFast 172,** unformatted

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Our companion tape back-up system for the MacFast. Our exclusive Turbo-Stream Technique has the ability to back-up and restore 20 megabytes of data in a blistering 4 minutes In the 5 megabyte volume mode, MacBack will back-up or restore in exactly one minute. incredible but true This is the fastest tape back-up unit available today for the Macintosh.

MacBack 20/MacBack 60

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a 10 or 15 megabyte removable SCSI hard disk subsystem for the Macintosh Plus and the Macintosh 512K This reliable removable Winchester cartridge provides unlimited capacity while providing complete data security. It can also be used as a back-up device instead of a tape MACSTOR, When security and unlimited capacity is a must

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MACSTOR 15 a 15meg removable drive.

MACPORT Plus Auto-booting SCSI Adaptor for the Macintosh 512 and 512/E

Here's where Peripheral Land expertise really shines An auto-booting SCSI adaptor for the Macintosh 512 or 512/E requires the new 128k rom This easy, convenient upgrade provides full SCSI compatibility with our hard disk or any other SCSI hard disk Now, you can boot directly from the hard disk, just like the Macintosh Plus without the expensive price tag

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☐ I could use *intermail* right now. Here's a check or money order for (check one)

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A demonstration version is available on the CompuServe and GEnie networks.

MW12

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Commentary/Jerry Borrell

You Can't Tell the Dodos from the House Cats without a Scorecard

Attempting an evolutionary play-by-play of the Mac playing field

Wandering the halls of the Macworld Expo in Boston last August, I felt like a modern-day Darwin just arrived in the Galápagos. The show floor was alive with new products for the Macintosh. Discussions with exhibitors indicate that many more are on the way. Apple's SCSI interface for the Mac and the preannouncement of the open-architecture machines have spurred development of Macintosh hardware and applications even further.

While the show was exciting, it also reminded me that the ongoing evolution of the Macintosh involves the survival of the fittest—a cruel competition for developers and a source of confusion for buyers. Hard drives alone make a suitable subject for ontogenetic study. After the Expo I counted 18 hard drive manufacturers supporting the SCSI interface and several more queuing up to compete in the open-architecture market. Darwinian observation suggests that few of these manufacturers will gain sufficient market share to spawn long-lived product lines. As with prehistoric beasts, those best able to compete are not necessarily the biggest; they are the companies best able to exploit market opportunities.

It is hard to remain a dispassionate observer of these changes. The outcome of this competition affects our investments and lives. Furthermore, as editors we are vested with responsibilities beyond neutral scientific observation. When we report our findings, readers act on them. We would like to predict which products are false starts, evolutionary dead ends—technologies and products that prosper for a time, only to reach an abrupt end due to market weakness, technology changes, or natural disasters.

We already know that the Mac is evolving into one of those phyla with particularly diverse subgroups. Some Macs will have color; others will have gray scale. How can we determine which are the ones that look good, cost less, run well, but in the long run represent a dead end? The permutations of this scenario are endless—good companies with bad products succeeding, companies and products evolving along with the Mac. Did I just buy an upgrade for my Macintosh that makes me the proud owner of a duck-billed platypus? Perhaps a dodo?

Software evolution presents some striking examples along this line of thought. Desktop publishing is especially apt. Products with competitive features are likely to succeed. The major developers of desktop publishing software have recognized this and are racing to implement kerning, hyphenation, graphics tools, and so on. But in the final analysis, product features are only one aspect among many—marketing, timeliness, luck, and change—that will be vital in the long run.

As de facto observers of the Mac's evolution, we publish our notes as reviews. They are our effort to put into perspective, make predictions about, and analyze products. We have redoubled our efforts in this time of rapid technological change, increasing the number of reviews while retaining an in-depth approach. The fact that we now print more reviews also means that they are more timely. Our reviewers are carefully chosen—people who know the Mac, know the applications area, and have some perspective on the Mac market. We now begin each review with a summary you can take in at a glance: a subject categorization, the strengths and weaknesses of each product, a word about copy protection, and other details.

We know that you want new product, buying, and how-to-use information. We attempt to balance our product reviews so that they reflect your needs and interests. In cases such as hard drives, where there are too many products to evaluate in depth through testing, we print comparative overviews. In areas of prime importance to readers where there are fewer products—such as word processors—we publish both an overview and individual product reviews.

In short, we are charting the course of changing technology. While remaining fair and objective, we strive to give you a complete picture of new products. □

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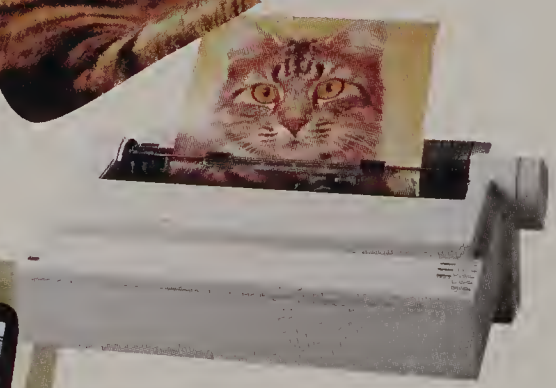

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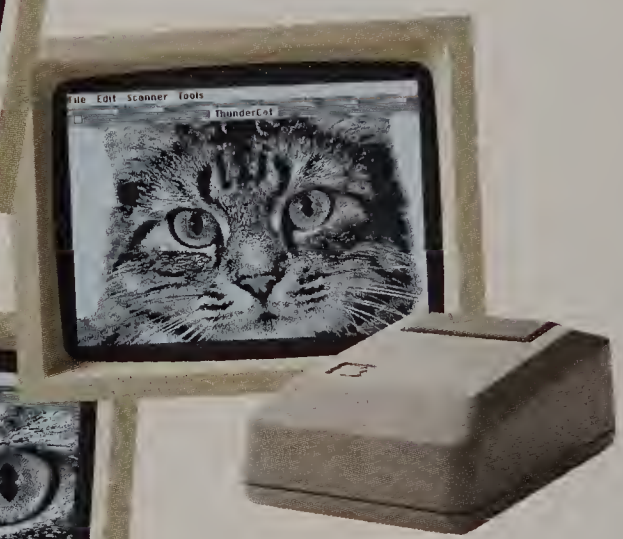

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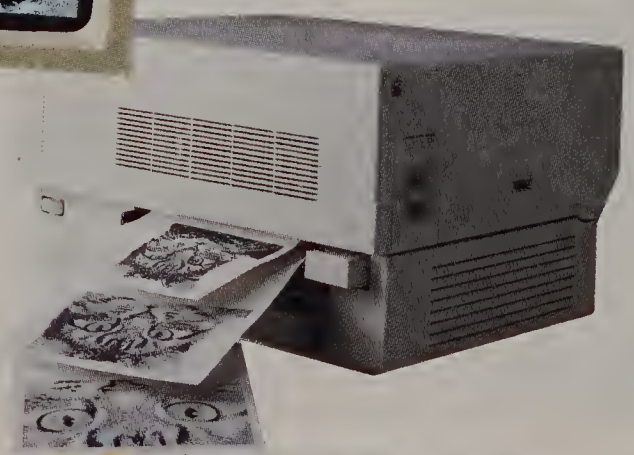

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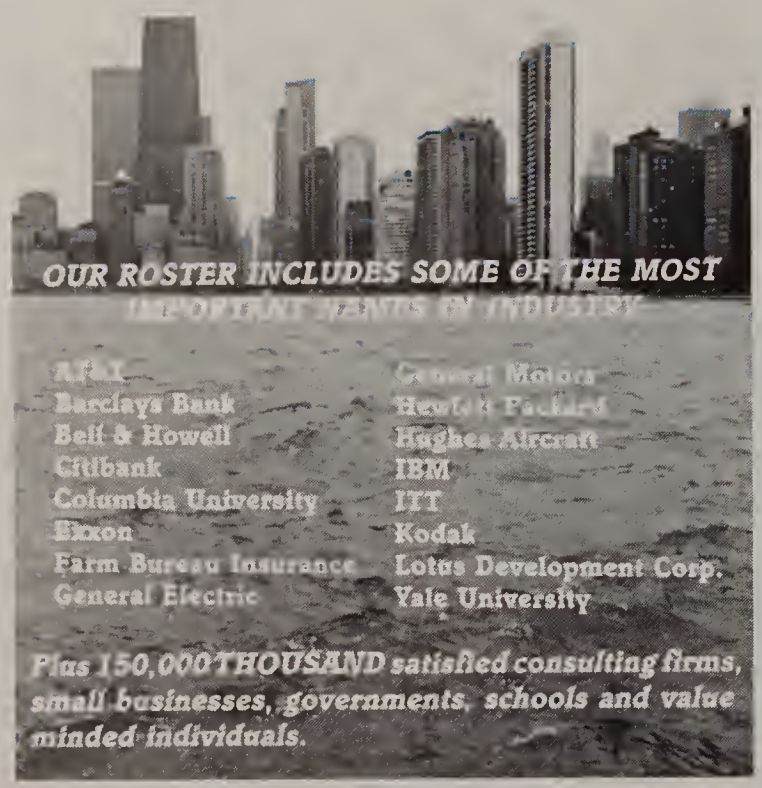

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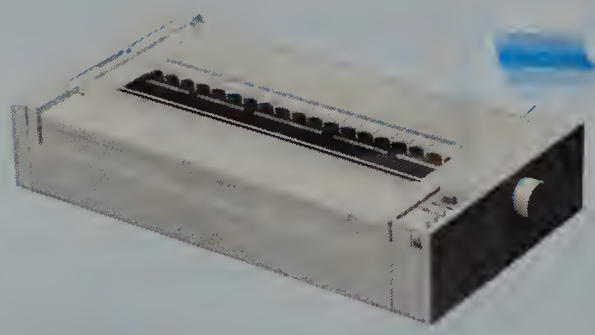

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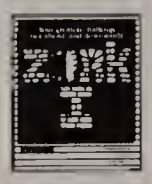

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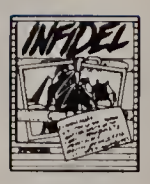

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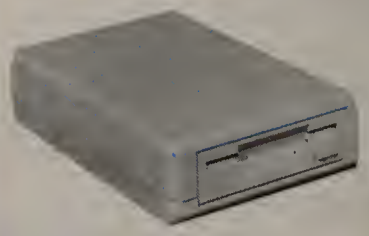

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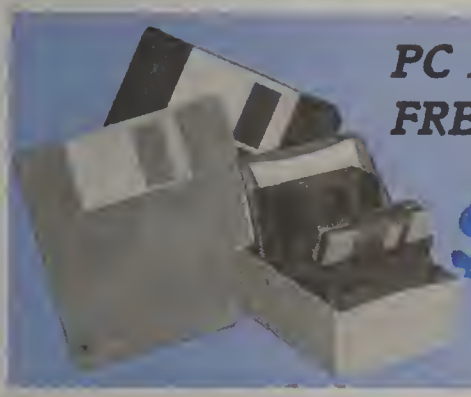

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Contributors Notes

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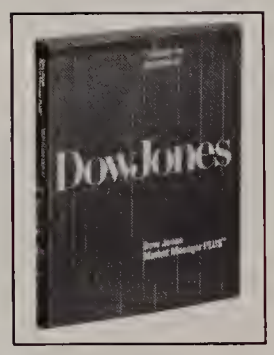

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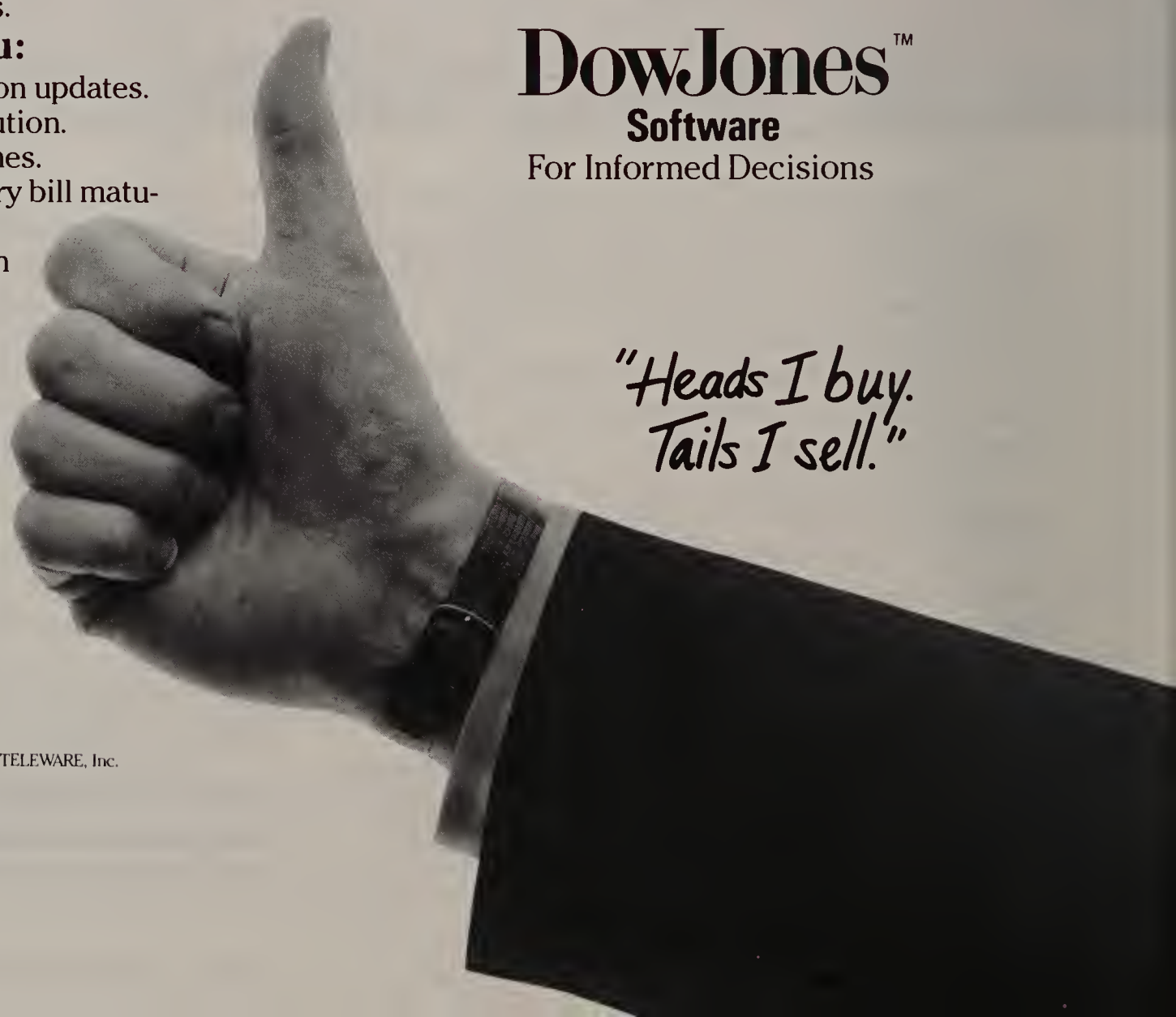

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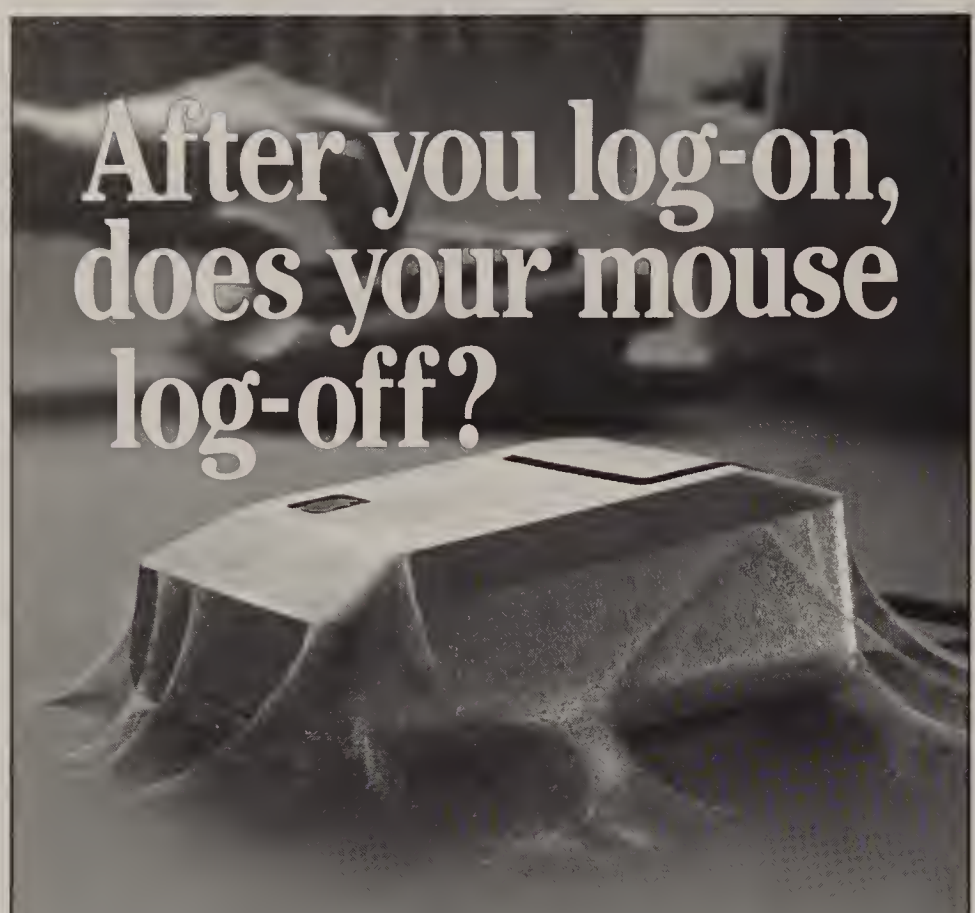

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Steven Levy

Citizen Cohen

How one man does desktop publishing

MAX SEABAUGH

Do you really need a $6000 LaserWriter—or even a $500 *PageMaker* program—to join the desktop publishing revolution? Can you exploit the power of the press with only a minimal Macintosh configuration? To answer, let me introduce desktop publishing's archetypical little guy: Eliot Cohen.

Eliot Cohen used to enjoy watching "The Odd Couple," gravitating toward the Oscar Madison half. Oscar was a *sportswriter,* and Eliot thought that was the ideal job. But as he approached 30, despite attending the creative writing program at Stanford University and accumulating a few bylines for local papers, Eliot's prospects of jumping into the major leagues of scribery seemed no closer than they did when he played the part of Oscar Madison in his high school play. After graduating from Stanford in 1984, he wrote to all the major league baseball teams seeking leads for a writing job. Instead he found work in city planning, a full-time job not far from where he grew up in the Queens borough of New York City.

Still, the curly-headed, mustachioed Cohen continued to pursue his dream of writing about baseball, at least on a moonlighting basis. He convinced the *Queens Tribune,* a small weekly newspaper, to allow him to cover the Mets occasionally. He threw himself into the work and soon had enough information, analysis, and statistical esoterica to fill many times the meager space allotted to the coverage. This was no perch to launch a sportswriting career from.

But sitting in Cohen's one-bedroom apartment was a solution: the 128K Macintosh and ImageWriter printer that Cohen had purchased at Stanford through the Apple University Consortium buying program. This was not the desired configuration pictured in the slick *Wall Street Journal* ads touting LaserWriters and *PageMaker.* But it would do. The Macintosh had already proven itself to Cohen as a useful tool, and he decided to use it somehow to create an outlet—his own—for all the juicy tidbits he collected in his extensive baseball reading and the studied conclusions he drew from the performances of players and managers.

Cohen now admits that had he not owned a Macintosh, he would never have attempted anything so rash as beginning his own publication. How could someone who had never wielded an X-acto knife undertake that without a computer?

On a visit to California in the spring of 1985, he put together the first issue. The material was largely leftover items from an aborted monthly column he wanted to write for the Queens weekly. So, almost casually committing himself to a fixed publishing schedule, he called his opus *Major League Monthly,* crafting a logo of sorts by using a Macintosh outline font.

The news in that first issue lacked an insider's perspective; Cohen admits that he harvested items everywhere, from *Sporting News* to more exotic places like *Sox Fan Notes.* But the rehash was cannily presented, along with well-reasoned judgments about teams and individual players. Cohen does know his baseball.

The publication was created entirely with *MacWrite.* The fanciest graphic touches were footnotes and headers. The first issue of *Major League Monthly,* eight pages reproduced on color paper at a local copy shop, cost $45 for 50 copies. Postage added up to more than $10. The cover price was an optimistic $1. One of Cohen's friends noted that it did not seem like a money-making proposition.

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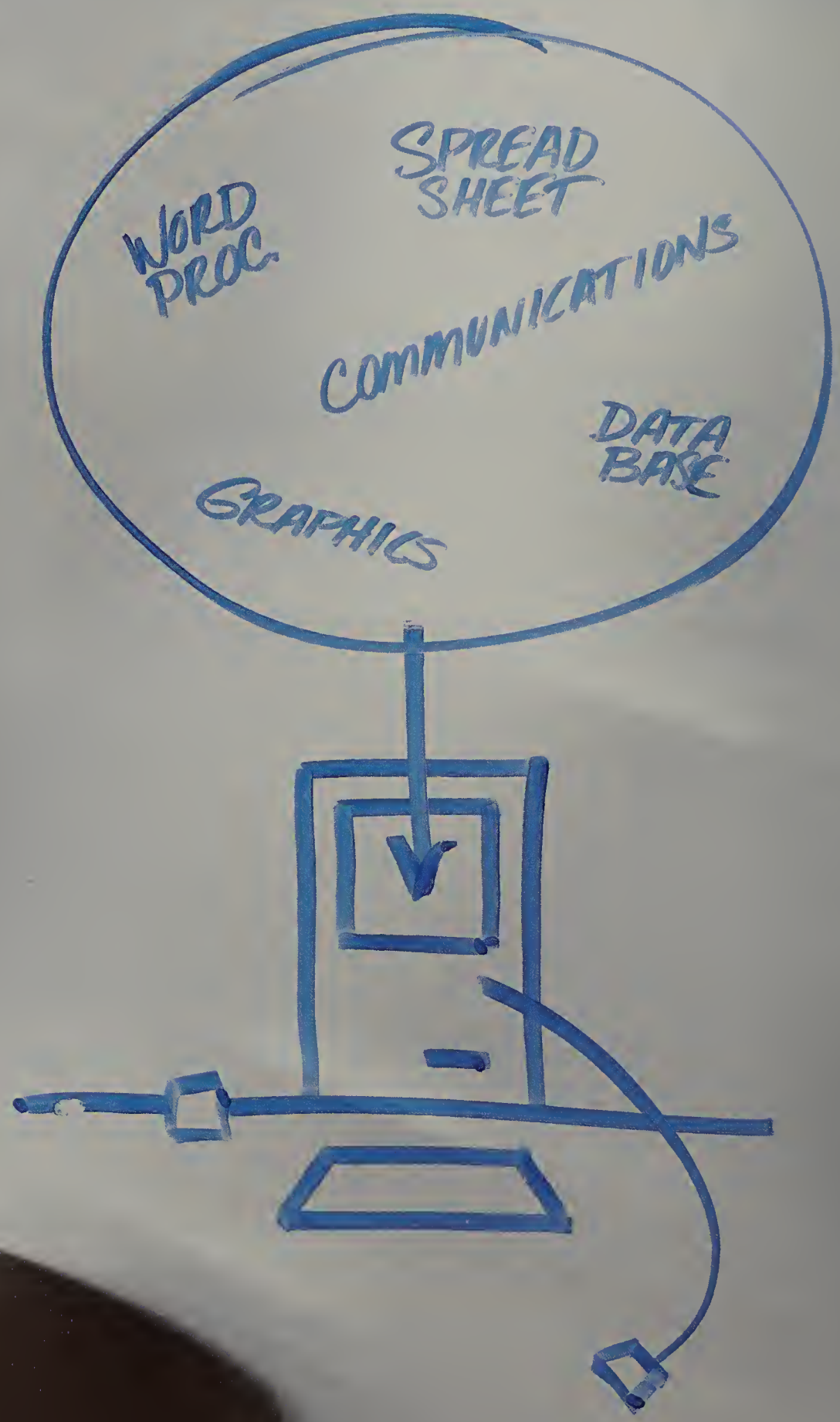

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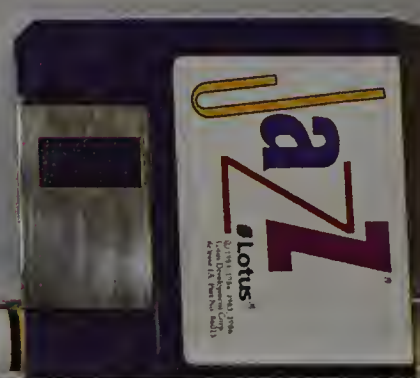

But profit was not Eliot Cohen's goal, at least not to begin with. He sent gratis issues to friends, baseball front-office personnel, and various sportswriters he admired (like his favorite, the *New Yorker*'s Roger Angell). He did, however, acknowledge that something had to be done about production costs, and when he returned home, he found a printer who agreed to do the second issue for less money. He also conducted his first circulation drive, reserving a three-inch ad in the Sports Monday section of the *New York Times* for a price of $550.

Three people responded to order $10 subscriptions.

Eliot Cohen learns from mistakes. He had better luck taking out smaller, less expensive ads in *Sporting News* and *Baseball America*. Appearing in those baseball-intensive publications also gave Cohen some credibility in the baseball community, which in turn gave him the gumption to actually call the big league teams and do some original reporting. Since he has a special interest in the literature of baseball, he also arranged for publishers to send him their latest books on the subject.

By the time the 1985 World Series was over, Cohen's newsletter had about 100 paid subscribers. Twice that many copies were still going free to sportswriters and baseball people; Cohen asked them to let him know if they still wanted it. Most did. The nicest response came from Roger Angell himself, who led off his *New Yorker* wrap-up of the 1985 baseball season with a remark about bright enthusiasts turning out quality publications about baseball. The first on Angell's list: *Major League Monthly*.

Things were very busy by then in Eliot Cohen's one-bedroom apartment. The front room was no longer a living area but a publishing office where Cohen would create a bigger and graphically more daring *Major League Monthly*. The publication was now in two-column format. Cohen accomplished this by printing out copy with a narrow margin and cutting and pasting the columns on the pages before bringing them to the printer. Literally cutting and pasting. Even in the age of the microchip, there are stores that will sell you scissors and glue. The layout was far from fancy, but it was tasteful and easy to read.

With a growing subscription list, Cohen felt justified in taking a vacation from his real job in March to attend spring training, though he wondered whether he would be received as a member of the sports media. The question was laid to rest when he appeared before the public-relations chief of the Boston Red Sox; the baseball executive immediately took Cohen to task for *Major League Monthly*'s critical coverage of the trades the BoSox had made in the off-season. Then he gave Cohen a press pass. He had actually been *reading* the thing. Virtually every training camp Cohen visited accepted him as a member of Oscar Madison's fraternity. The sole exception was the Chicago White Sox, and subsequent events have proven the mental bankruptcy of that team's front office.

Cohen found that if you hold a notebook in hand when you approach a baseball player, more often than not the player will treat you as a bona fide journalist. Since Cohen had just turned 30, he was older than many of the players and was unnerved to hear himself being called "sir" by these splendid gladiators of the dia-

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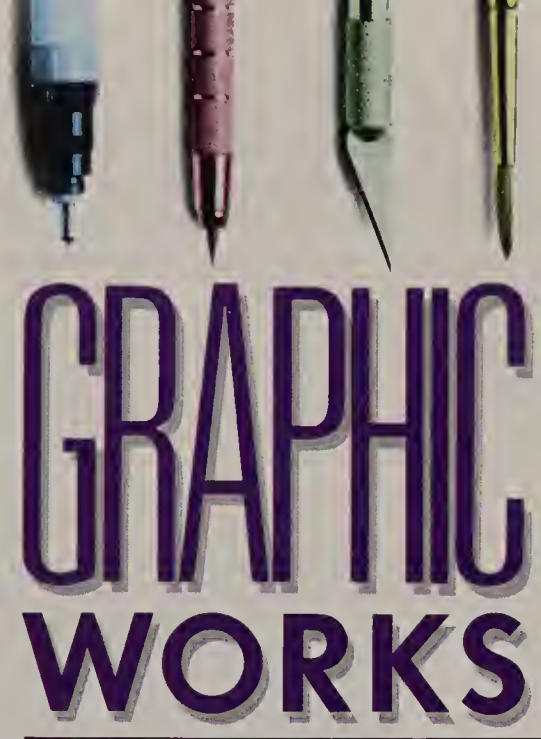

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mond. He wanted to say, "Wait a minute; I'm supposed to admire *you*—don't you understand?"

It was something many a sportswriter has had to contend with. And to be honest, Eliot Cohen had mixed feelings about leaving the ranks of fandom and entering the profession of journalism. He no longer feels comfortable asking for autographs, formerly a delightful pursuit. But he prefers reporting to collecting signatures, a choice made possible by his Macintosh-generated newsletter.

The 1986 season was a banner one for American League rookies and for *Major League Monthly,* too. Subscriptions increased, particularly after Cohen bought the mailing list of a popular baseball newsletter that was about to retire. Cohen now estimates that his paid circulation approaches the four-figure mark. (When the publication shifts from red ink to black, an event yet to come, we can assume that the editor/publisher will be increasingly circumspect about hard numbers.) Issues have grown to be as large as 24 pages, loaded with original articles on subjects ranging from baseball commissioner Peter Ueberrothe's drug plan to the ascension of former ball players to front-office positions, book reviews, *Multiplan*-aided statistical analyses of things like how batters perform on turf as opposed to grass, previews of upcoming games, and a monthly list of players' birthdays.

Before the 1986 season, Eliot Cohen regarded the newsletter as an experiment. Now he feels sufficiently confident to announce that he's in for the duration.

All this time Cohen has been working his full-time job in city planning. *Major League Monthly* is researched, written, edited, and laid out nights and weekends. Besides whatever time he manages to spend with his girlfriend (who is partial to the Baltimore Orioles), Cohen has virtually no personal life. But he does have a hobby that, he now realizes, has the potential to transform his idle dream of being a sportswriter into reality. On the basis of his growing reputation as the majordomo of the *Monthly,* Cohen is beginning to get offers to write for other publications. There is even talk of him writing a syndicated column named after the newsletter. It would be called *Major League Monthly Reports.*

"Instead of the newsletter promoting me, I would be promoting the newsletter," says Cohen.

Things have gone so well, in fact, that sometime during the 1986 season Cohen began to contemplate some improvements in his production process. He realizes that eventually a switch from *MacWrite* to *PageMaker* is in order. He's already ordered a memory upgrade—from 128K to a megabyte. Also in the cards is the step up from ImageWriter output to LaserWriter pages. Cohen has noticed several services right in Queens where he could take *PageMaker* disks and get laser output, for a very modest price. The expense would be more than covered by the savings in printing expenses because of the smaller type size he could use.

That's for later. This past summer, not long after the first anniversary of the *Monthly,* the self-made publishing magnate of the baseball world made a much more basic purchase: an external disk drive. His first. All this time, Eliot Cohen has been creating his own publication on the Macintosh, a publication that changed his life, without even the benefit of an external disk drive.

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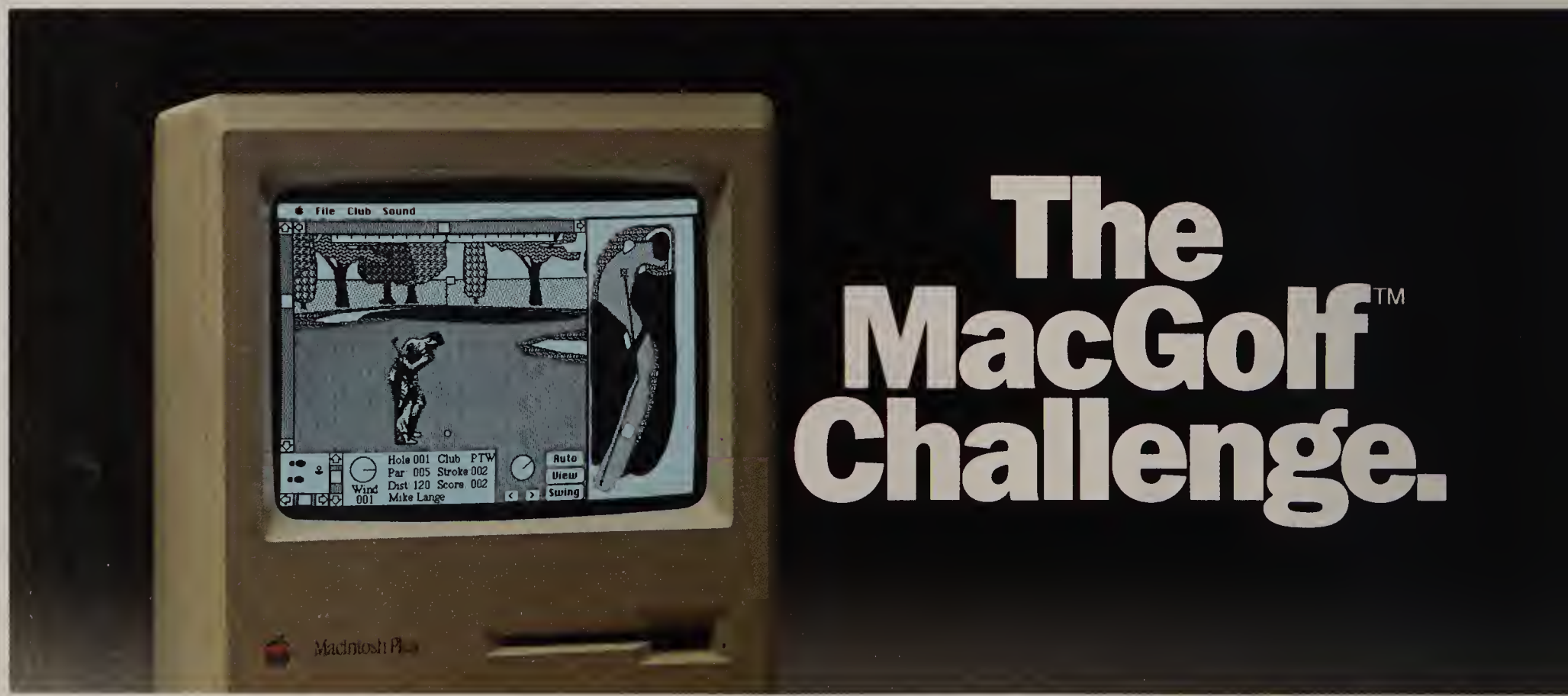

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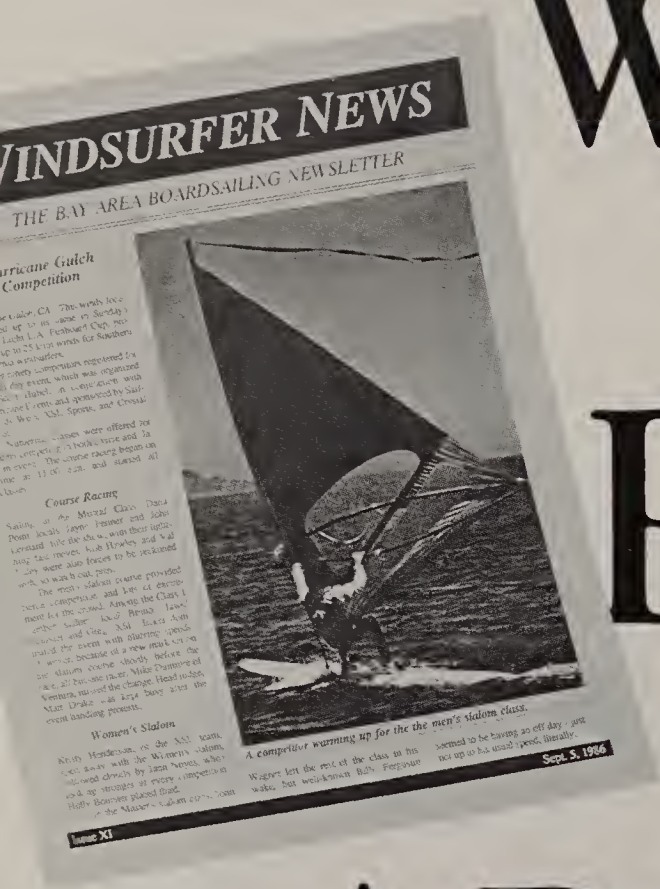

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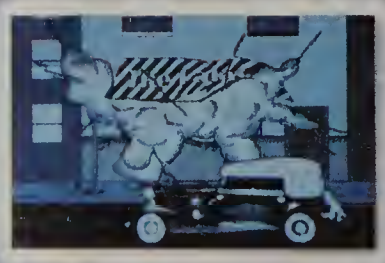

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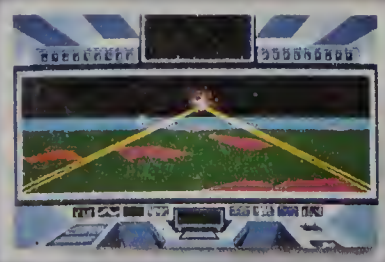

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Macworld News

MARK HANAUER

Bob Gurr, chief engineer for Universal Studios' King Kong attraction, is not afraid to place the Macintosh in the jaws that might have devoured Fay Wray.

King Kong

On the Universal Studios' tour, you can't help but notice the 30-foot King Kong, complete with facial expressions and hot, steamy banana breath, towering above the crowd and flailing indignantly.

Bob Gurr, vice president of engineering at Sequoia Creative, supervised the engineering and construction of the 13,488-pound, computer-controlled replica. Gurr, who also engineered the Olympic spacecraft that flew over the Los Angeles Coliseum during the 1984 Olympics, used the Macintosh to handle all of the business activity and some of the design of the $5.4 million King Kong project.

Gurr believes that software should be practical—not slow to learn due to fancy, complex features. *MacProject* provided visual feedback, and *Microplanner* was used to construct a detailed planning calendar to verify timing and installation costs in critical areas of the eight-month project. *Excel* turned out to be the real workhorse, however, since it was used for everything from job costing to keeping track of the more than 3000 parts used to create the gorilla.

But what impressed Gurr the most was how the Macintosh allowed team members to share information and thus complete the job efficiently.

Faster PostScript

Adobe has introduced the Atlas PostScript controller, which generates 20 to 40 original 300-dot-per-inch pages per minute. The controller is designed to work with the 68020 microprocessor, which is the one used on the next-generation Macintosh and LaserWriter. Currently, the Agfa-Gevaert P400 is the only printer we know of that uses the Atlas controller. The $28,000 printer outputs 18 pages per minute at 400 dots per inch (which yields 160,000 dots per square inch compared to 90,000 at 300-dot-per-inch resolution), and includes 1 megabyte of font cache, 1 megabyte for downloadable fonts, 4 megabytes of imaging RAM, and a 20-megabyte hard disk.

Adobe has also improved the performance of Linotype PostScript controllers, which have been widely criticized for being too slow.

Apple UK Takes Off

Although the Macintosh continues to be more popular in the U.K. than on the continent, CP/M machines and the IBM PC have dominated the market. But the tide is turning as desktop publishing becomes the rage. Even more important, the Plessey Company UK has recently signed an agreement to market the Mac in the U.K., where it will focus on selling to corporate, government, and institutional customers.

Plessey, an electronic and telecommunications firm, evaluated computers from IBM and Hewlett-Packard before settling on the Mac. According to Dave Jones, desktop publishing marketing manager for Apple U.K.,

every one of the almost 8000 engineers at Plessey will have a Mac within three years. The company plans to purchase Macintoshes for use in running other areas of its operations, including accounting, engineering, marketing, and publishing.

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Fighting Fire with File(vision)

The Macintosh may become the latest tool in the fire fighter's arsenal if a pilot program, conducted by the National Oceanic and Atmospheric Administration (NOAA), is successful. Already, the Macintosh is helping Seattle fire fighters battle fires and spills that involve hazardous chemicals.

NOAA, an agency within the U.S. Commerce Department, is experimenting with the Macintosh at a time of escalating problems—and increased awareness of the dangers—involving the handling of fires and other emergencies in locations where toxic chemicals are processed or stored. The attempt to map strategy for hazardous chemical emergencies with the Mac, if successful, could lead to placement of Macintosh computers in most of the nation's firehouses. "Mobile Macs" would ride with the fire fighters in hazardous-materials response vehicles.

In its pilot version, the Computer-Aided Mobile Emergency Operations System uses Telos's *Business Filevision* to store information about the locations, characteristics, dangers, and emergency response procedures for all known hazardous chemicals in Seattle. Digitized street maps of the city are stored on disk by quadrant so that fire fighters can identify a location and view it at close-up range.

The Mac's intuitive graphics interface allows fire fighters to point at a grid map with the Mac's mouse to view an enlarged area marked with the locations of chemical facilities. Clicking on sections of the map provides detailed information that would be helpful in an emergency, such as the floor plan of a specific facility or graphic icon symbols indicating whether the chemicals are in small laboratory quantities or in large storage vats.

A click on the chemical symbol accesses a database with response information for the hazardous substance. In a worst-case scenario, the program's map outlines areas of the city that should be evacuated if the emergency is not quickly brought under control.

According to the director of the pilot program, the Macintosh is the best machine for the job because of its short training time and easy-to-use graphics interface.

NOAA is evaluating the program's effectiveness to determine whether to install the Macintosh in thousands of cities across the nation to help fire fighters minimize the potential dangers that hazardous chemicals pose for fire fighters, citizens, and property.

GEORGE STEINMETZ

Fire fighters in Seattle are using the Macintosh to maintain a database of strategies for handling emergencies in locations where toxic chemicals are present.

Architectural Schemes

Long before drafting detailed production drawings, an architect conceptualizes a building or a landscape in a series of quick sketches. This aspect of the design process is often referred to as the "schematic phase." *Schema,* a new program developed by the Harvard Laboratory for Computer Graphics, lets architects draw three-dimensional schematic drawings to represent buildings, landscapes, and urban environments.

Most CAD programs aren't suited to architectural schematic designs that require a large number of simple surfaces. *Schema* lets architects build wire-frame models with up to 6000 faces, permitting complex 3-D architectural designs. You create 3-D objects by first building polygons side by side and then choosing an Extrude command to add depth. Once created, objects can be moved, rotated, scaled, and transformed into alternate shapes such as pyramids and cones. At present, printing can be accomplished only with a screen dump, by pressing ⌘-Shift-4. You can trace source maps by attaching a digitizing tablet and then use the program to create a 3-D model. The program is available from the Harvard Lab at 48 Quincy St., Cambridge, MA 02138.
—Adrian Mello

DAVID WAGENAAR

Motorola's Brian Carlson says the Mac is used companywide for a variety of tasks.

The Corporate Mac

One of the larger corporations in the Macintosh vanguard is Motorola—Apple's second-largest customer in 1985, according to Brian Carlson, Motorola's manager of corporate end-user computing. He estimates that there are now approximately 1500 to 2000 block-purchased Macs throughout Motorola's four main offices. In addition, as many as 5000 Macs have been purchased individually by different divisions.

In semiconductor operations, as well as in the production of electronic circuits, cellular telephones, and two-way radios, the Mac is used for tasks such as schematic drawings, diagram flows, and integrated circuit board layout. The machine is used companywide for less complex tasks like presentation graphics, word processing, and spreadsheets. Accord-

(continues)

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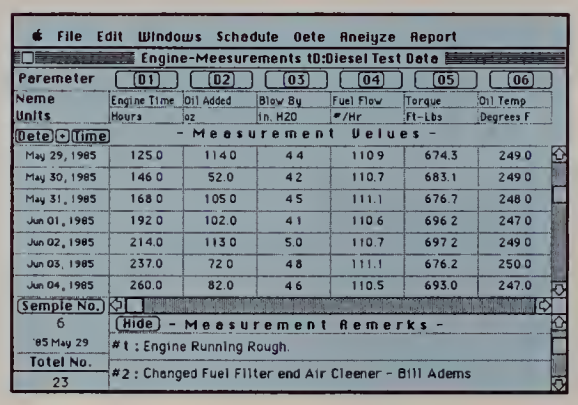

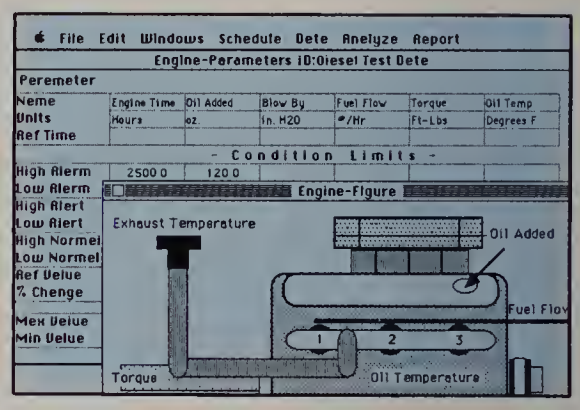

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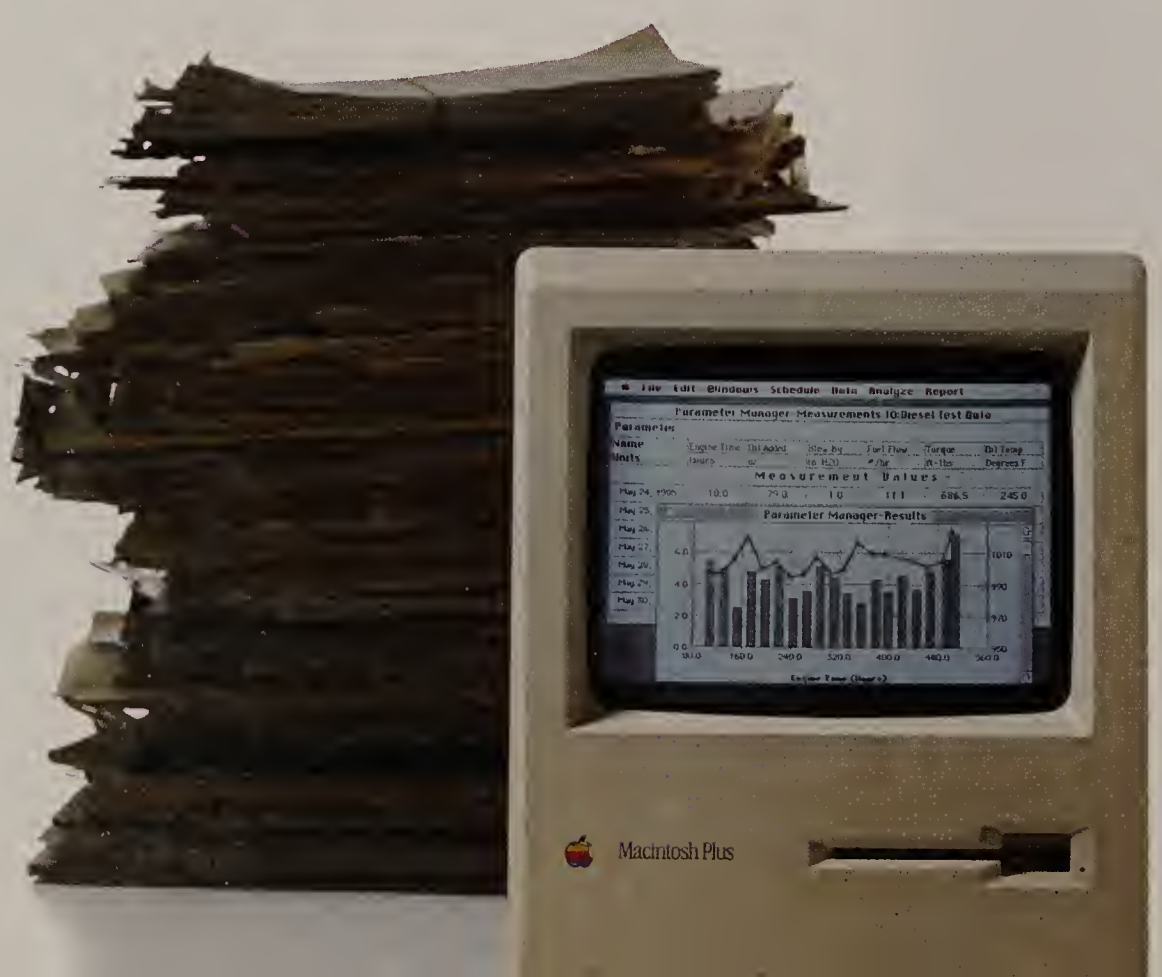

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Circle 576 on reader service card

Corporate Mac (continued)

ing to Carlson, Motorola will begin to utilize the Macintosh for low-end publishing.

With the introduction of new, more powerful incarnations of the Macintosh and enhanced software, expect Apple's logo to proliferate on the desktops of other large corporations as well.–*Robert Buderi*

LESLIE WONG

Author and illustrator Michael Green at one with the Mac. Discover his path to enlightenment in the pages of his book.

Zen & the Art of the Macintosh

It may not be the sound of one hand clapping, but the little smiling icon greeting you each time you start up the Mac has a definite Buddha-like quality. The machine has always promised a certain kind of enlightenment, but Michael Green takes its image and text manipulation capabilities to new heights–or better, new inner depths–in *Zen & the Art of the Macintosh,* subtitled "Discoveries on the Path to Computer Enlightenment."

Green, an illustrator and author, bought a Mac and then chronicled his journey of investigation, delight, frustration, and insight as he mastered the machine. The entire book was reproduced directly from the Macintosh originals and printed on 8- by 10-inch pages.

The difficulty of producing an image, according to Green, is inversely proportional to how simple the final image appears. The "inner space" he takes the reader through is his thoughts as he contemplates an image he wants to produce and then figures out how to do it.

Green has succeeded admirably, giving the reader insight into the creative process and into the potential of the Macintosh to bring out the artist and philosopher that lurks in us all.–*Jeffrey S. Young*

Meeting Room Macintosh

Bernie deKoven is the world's first *technographer* mostly because he coined the phrase himself. It's part of a phenomenon he terms *conference table publishing,* or *computer-enhanced meetings.*

DeKoven's concept is to record notes and comments on the computer as they occur at the hundreds of meetings the average business person attends every year. Then, using a video projector and the manipulation capabilities of Macintosh programs like *Microsoft Excel, MacDraw, PageMaker,* and *More*–which are linked through the *Switcher* for fast exchange–a large-screen version of the material can be refined and laser-printed by the time the meeting is over.

DeKoven's Computer Enhanced Meetings, based in Palo Alto, California, is not the only commercial outfit specializing in computer-aided corporate meetings and conferences. Interaction Associates has recently completed installation of a multiple-Macintosh conference site in San Francisco. A facilitator/group leader guides each meeting, and a recorder captures the information on computer.

Interaction Associates offers custom software written especially for its installations that allows up to nine pages of notes to be reduced and displayed on a single projection screen. It also plans to introduce an instant group-polling package that would provide a graphic gauge of the meeting's collective response to any question, and an electronic tablet to enter handwritten material directly into the computer for deciphering and printing.

But these commercial systems can be expensive. What makes deKoven's approach so compelling is that he is using off-the-shelf Macintosh software to create a new way of using the Mac. Just as desktop publishing has put the power of the printed word in the hands of many, computer-enhanced meetings put the power of the Macintosh hardware and software in the collective hands of any group trying to make informed decisions.–*Jeffrey S. Young*

JOE ANDRIS

Macintosh Novelties

It's no wonder that a graphics-oriented machine like the Macintosh brings out the artist in people. Just as desktop publishing service centers turn words into typographic gems, Computer Expressions, an advertising specialty and premium company, plans to do the same with Macintosh graphics–but in a novel way. The company transfers images generated on the Macintosh onto coffee mugs, T-shirts, puzzles, chocolate bars, and other items to create customized corporate gifts. Contact Computer Expressions at 3700 Market St. #308, Philadelphia, PA 19104, 215/222-4400.

LEE YOUNGBLOOD

***The Macintosh is taking a central role in the meeting rooms of corporate America with the aid of video projectors, laser printers, and programs like* More *and* Excel.**

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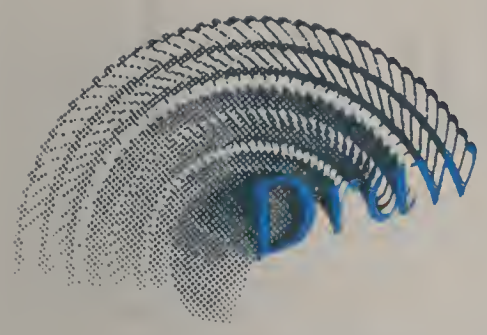

PostScript Draw

The Macintosh has largely been unable to harness the power of PostScript to create beautiful fountains and spirals of text. The Mac's graphics language–QuickDraw–just doesn't have the capability to create those effects on screen. But several developers are working on products that get around that limitation. Cricket Software has announced *Cricket Draw,* and Adobe Systems is reportedly working on a similar product. In addition, Altsys Corporation, publisher of *Fontastic* and *Fontographer,* is putting together a package.

Basically, these programs let you create customized effects with PostScript and include them in documents. QuickDraw is used to represent the swirls, arbitrary shapes, and typographic effects of PostScript on screen. The PostScript file itself is carried with the document and sent to the printer along with the rest of the document (which was translated to PostScript code from QuickDraw at print time).

Cricket Draw uses a hidden capability of QuickDraw that allows you to attach PostScript commands to a QuickDraw file as picture comments. The PostScript thus travels with the QuickDraw picture. The drawback of the method is that the QuickDraw file is enlarged, so cutting and pasting these pictures could be less smooth.

Jim Von Ehr, president of Altsys, is working with a team of developers–including Adobe, Aldus, Enabling Technologies, and Symmetry–to formulate another way to include PostScript files in documents. The encapsulated PostScript (EPS) format allows applications, such as desktop publishing programs, to read PostScript files directly. Applications must be modified slightly to work with the EPS format. Certainly, these PostScript formats will make it easier to take advantage of PostScript's unique capabilities.

BOB SACHA

Jim Von Ehr of Altsys is among the developers working with PostScript.

AppleTalk Connects

Over a dozen exhibitors at the Boston Macworld Expo participated in a network demonstration linking their equipment via an extensive AppleTalk network that spanned the exhibit hall floor. The demonstration, originally conceived by the AppleTalk Developers Association, displayed AppleTalk's flexibility in integrating products from a variety of manufacturers. Exhibitors who participated included Apple Computer, Think Technologies, Hayes, Tangent Technologies, Aldus, General Computer, Infosphere, Kinetics, QMS, Farallon Computing, Internet, and Blyth Software.

The demonstration, the first of its kind for Macintosh products, consisted of local networks in each exhibitor's booth connected via three areawide AppleTalk networks and an Ethernet backbone. In addition to demonstrating AppleTalk's versatility, the event showcased a plethora of network products.

Kinetics used its FastPath gateway to link AppleTalk networks via an Ethernet cable and attached an Integrated Solutions computer to the cable to run as a file server, using a UNIX version of Centram's TOPS network software.

Think Technologies ran its *InBox* mail software at sites throughout the show, while exhibitors–including Aldus and QMS–demonstrated remote printing over AppleTalk.

Two products that made this network configuration possible were Hayes's InterBridge and Farallon Computing's PhoneNet. InterBridge allowed AppleTalk networks to be divided into connected zones. Because PhoneNet uses standard phone wiring instead of the special AppleTalk cabling, Farallon was able to connect exhibitors' booths with the in-place phone wiring.–*David Ushijima*

GEORGE STEINMETZ

Blyth Software's Michael Kinney counts on the Omnis Developer Conference to support Omnis application developers.

Omnis Developer Conference

If the Omnis Developer Conference is any indication, third-party development for *Omnis 3* is gaining serious momentum. The conference, held in Boston prior to the August Macworld Expo, attracted over 200 third-party developers and consultants for the popular Macintosh relational database. The program included technical sessions and practical advice on building and selling *Omnis 3* applications. Topics of discussion included Apple's Value-Added Reseller (VAR) program and the ways in which Apple works with third-party developers, and various Blyth staff members talked about vertical and international markets, *Omnis 3* multiuser applications, and product marketing and distribution.

There were also demonstra-

(continues)

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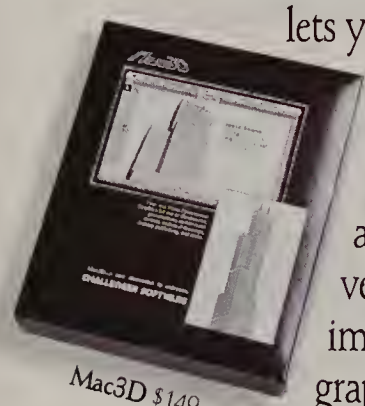
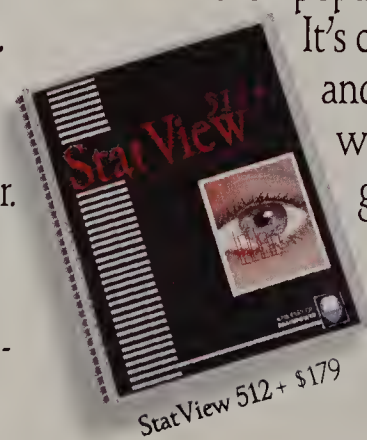


Mac3D $149

Twist them, turn them, reshape, bevel, round, flip and flop them. The new version, 2.0, features an improved tool palette, orthographic projection, and 2D to 3D extrusions. Sounds like: *an all around good time!*

Analyze your approach.
StatView 512+ is the megapowered statistical package from BrainPower. You need a 512k Mac to run it, because it includes advanced statistical procedures like step-wise regression, multivariate analysis techniques, and contingency (frequency) table analysis. StatView 512+ also accepts all data created under the original StatView. Sounds like: *a good bet!*

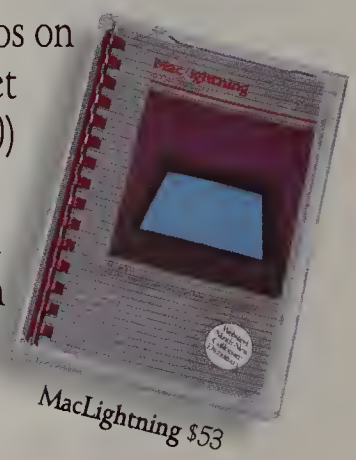


StatView 512+ $179

Publish a newsletter about it.
Manhattan Graphics has just released a major upgrade of their popular page processor. It's called **Ready,Set,Go!3** and has a full-functioned word processor with global search and replace, spell checker, real-time hyphenation, and more.

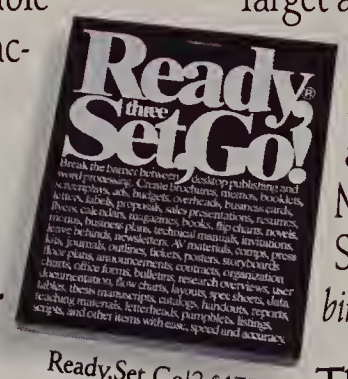
New paste-up features include dynamic text runaround, automatic text-reflow, multiple windows, and a design grid system. Sounds like: *front page news!*

Check your spelling while you're at it.
And to make sure you don't make any typos on your masterpiece, get the new version (2.0) of Target Software's **MacLightning** spell checker. The built-in dictionary (80,000 words!) is almost triple the size of the original.



MacLightning $53

Target also offers a thesaurus, legal dictionary, and medical dictionary as enhancements to MacLightning. Sounds like: *a spellbinding program!*



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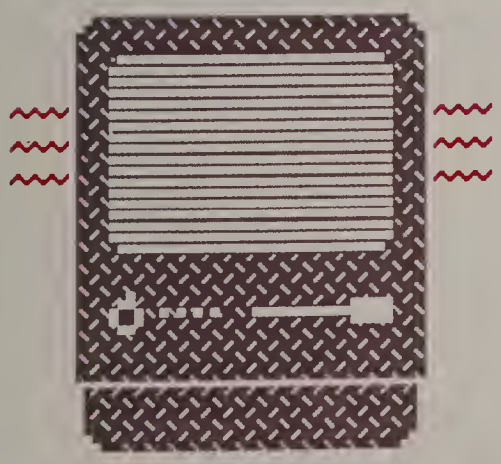
Omnis Developer Conference (continued)

tion rooms equipped with various Macintosh-compatible networks, all running *Omnis 3* applications created by conference attendees. The programs ranged from general accounting to retail store management. For a copy of the *Omnis 3 Business Directory,* which contains a complete list of *Omnis 3* third-party software and consultants, contact Blyth Software.—*Steve Mann*

A Tempest in a Teapot

A lead-shielded Macintosh with a modified power supply that guards against electronic eavesdropping is now available for high-security intelligence operations. Manufactured by Systematics General of Sterling, Virginia, the Tempest Macintosh is distributed by Systematics General and Falcon Microsystems of Landover, Maryland.

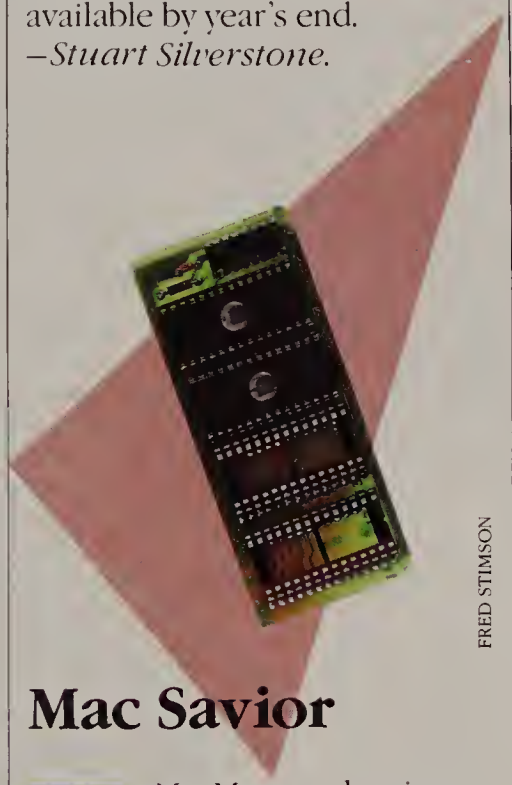
Security features increase the weight of the standard 512K Mac from 16.7 to 26 pounds and boost its list price from $1995 to $5945. Except for the second internal 400K disk drive mounted on the right side and



the shielded cable running from the keyboard to the computer, the Tempest Mac's appearance and operation do not differ from the nonsecure version.

Theoretically, sophisticated listening devices could monitor the radio-frequency emissions of a standard computer from a distance and reconstruct the text and data in its memory files. This is why federal government agencies from the FBI to the CIA require Tempest modifications for the electronics equipment they buy for security operations.

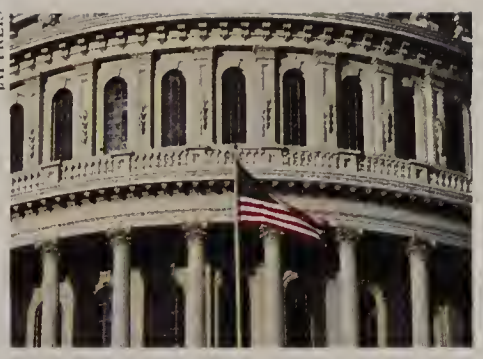
A Tempest AppleTalk, which links Tempest Macs, enables electronic mail communications and sharing of Tempest peripherals such as laser printers and file servers. A Tempest LaserWriter should be available by year's end. —*Stuart Silverstone.*



FRED STIMSON

Mac Savior

MacMemory has introduced the ultimate in safety for using the blazing speed of RAM disks on the Macintosh Plus. MaxSave is a recoverable RAM disk, offering the reliability of a hard disk drive with the speed of a RAM disk. The $119 combination hardware and software product recovers your data and the RAM disk intact in the event of a system crash (but not a power failure). MaxPrint spooler software is included to let you do background printing on the ImageWriter. For more information contact MacMemory at 473 Macara Ave. #701, Sunnyvale, CA 94086, 408/773-9922.



JAY FREIS

Congressional Desktop Publishing

Members of Congress are turning to the Macintosh to produce massive mailings as Capitol Hill's reliance on desktop newsletter publishing and computer-aided constituent correspondence grows.

Aides to senators and members of Congress rely on the Mac for a variety of tasks, such as preparing speeches, creating newsletters, generating response mail, designing newspaper ads, and producing press releases.

In the office of Donald Ritter, Republican representative of Pennsylvania's 15th district, a Mac sits on every desk to handle nearly all business correspondence, including near-typeset-quality letters written to influence fellow legislators. Besides producing a 200,000-circulation newsletter on *PageMaker,* these Macs in Washington telecommunicate with others in Ritter's home district and with the legislative reference database of the House Information Service. Ritter's press secretary even composes press releases on a Mac and sends them by modem to the three newspapers in Ritter's district.

Other congressional aides are using the Mac as well. For example, the press secretary to Congressman Fofo Sunia of American Samoa uses *PageMaker* software to create a monthly four-page newsletter in two languages for some 7000 constituent families that live in that U.S. territory. And Doug Thompson, Republican staff aide for the Science and Technology Committee and chairman of the Congressional Mac Users Group, uses *Filevision* on the Mac to create briefing books with sophisticated organization charts and data display maps for members of Congress.

The *Weekly Bulletin* reports on what legislation is likely to be introduced in the coming week. It provides political and issues analysis from the Environmental and Energy Study Conference, the largest of numerous legislative service organizations in Congress. Each of the bulletin's ten staff members has a Mac Plus equipped with *Microsoft Word* and *PageMaker,* which makes the task of publishing this 30- to 40-page newsletter a lot easier.—*Stuart Silverstone*

New Adobe Fonts

Another set of fonts is available from Adobe Systems, bringing the total number of Adobe typefaces for PostScript printers to nearly 100. Included in the latest release are Helvetica Light, Helvetica Black, Helvetica Condensed, Trump Medieval, ITC Galliard, ITC New Baskerville, ITC Korinna, Goudy Old Style, Melior, and a musical notation font, Sonata. For more information contact Adobe Systems at 1807 Embarcadero Rd., Palo Alto, CA 94303, 415/852-0271. □

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Jazz or Excel Training . . . . . 39.
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The Mac BatteryPak *(9 desk accessories)* 27.
Home Pak *(telecommunications, filer)* . . . . 29.
Time Link *(time management system)* . . . . 29.
Borland International
Sidekick w/Phonelink. . . . . 59.
Reflex *(information management analysis)* 59.
BPI Systems
General Accounting *(full-featured)* . . . . . 229.
BrainPower
Think Fast *(improves recall)* . . . . . 23.
Chipwits *(educational, robot simulation)*. . . 26.
StatView *(statistics package)* . . . . . 59.
Designscope *(electronic circuit design)* . . 129.
StatView 512+ *(req. external drive, 512k)*. . . 179.
Broderbund
Print Shop *(create cards and memos)*. . . . . 49.
Geometry *(over 350 problems!)* . . . . . 69.
CAMDE
Nutricalc *(diet & nutrition analysis)* . . . . . 49.
Casady Company
Fluent Fonts *(two-disk set)* . . . . . 29.
Fluent Laser Fonts. . . . . *each* 49.
Central Point Software
Copy II Mac *(includes MacTools)* . . . . . 20.
Challenger Software
Mac3D *(3D graphics, CAD features)* . . . . 149.
Chang Labs
Rags to Riches Ledger . . . . . 125.
Rags to Riches Receivables *(req. 512k)* . . 125.
Rags to Riches Payables *(req. 512k)*. . . . . 125.
Inventory Control . . . . . 245.
Professional Billing . . . . . 245.
Rags to Riches Three Pak . . . . . 299.
Cortland
TopDesk *(7 new desk accessories)*. . . . . 35.
Creighton Development
MacSpell+ *(spell checker, req. 512k)* . . . . . 55.
Cricket Software
Statworks *(statistical package)* . . . . . 79.
Cricket Graph *(multiple windows)*. . . . . 129.
DataViz
MacLink *(transfer Mac/IBM data)* . . . . . 89.
Desktop Graphics
DrawArt *(MacDraw artwork, req. 512k)*. . . . 29.
DrawForms *(requires MacDraw)* . . . . . 30.
Digital, etc.
Turbo Maccountant *(w/video tape)*. . . . . 299.
Dow Jones
Straight Talk *(access News/Retrieval)* . . . . . 62.
Spreadsheet Link . . . . . 65.
Market Manager PLUS . . . . . 129.
Dreams of the Phoenix
Day Keeper Calendar . . . . . 27.
Phoenix 3D *(3D graphics)* . . . . . 27.
Quick & Dirty Utilities Vol. 1 or Vol. 2 . . . . . 27.
Twelve-C Financial Desk Accessory . . . . . 27.

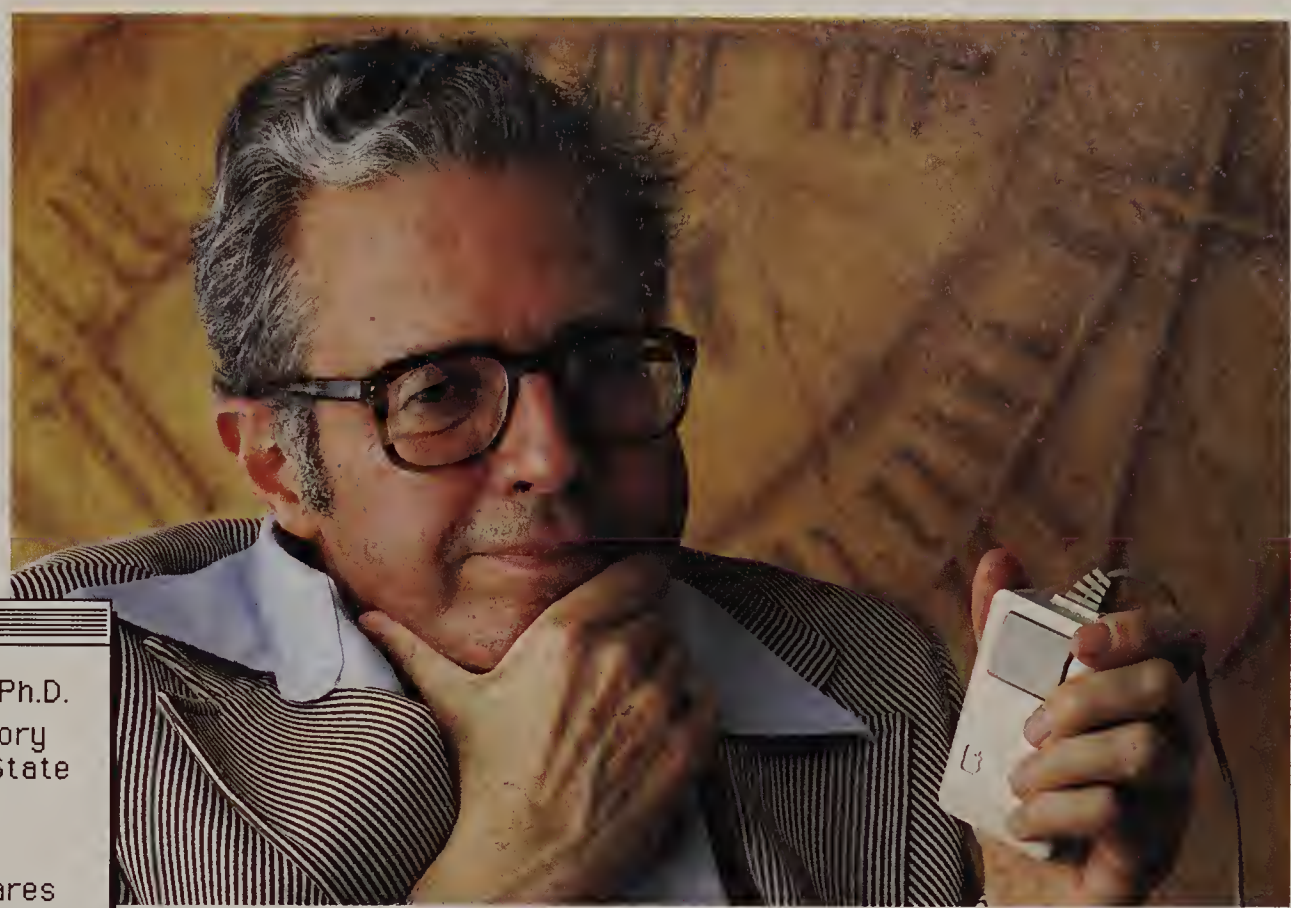
Dubl-Click Software
World-Class Fonts! Vol. One or Vol. Two . . $29.
Calculator Construction Set . . . . . 39.
EDO Communications
Laserworks *(requires 512k, Laserwriter)* . . 229.
Electronic Arts
Financial Cookbook *(financial formulas)*. . . 32.
Deluxe Music Construction Set . . . . . 32.
Enabling Technologies
Easy3D *(create solid 3D objects)* . . . . . 79.
Enterset
Quickpaint *(find MacPaint files fast)* . . . . . 27.
Quickset *(icon-driven desk accessories)*. . . 27.
Quickword *(word processing tool)* . . . . . 32.
MacGAS *(spell checker, 512k, ext. drive)* . . 55.
1st Byte
First Shapes *(preschool learning tool)* . . . . 32.
Speller Bee, KidTalk, or Mathtalk . . . . . 42.
Smoothtalker *(speech synthesis)* . . . . . 52.
Forethought
Factfinder *(free-form info organizer)* . . . . . 79.
FileMaker *(custom forms & reports)* . . . . . 99.
FileMaker Plus *(feature-packed database)* 159.
Fortnum/Southern
MacInooga Choo-Choo *(train set, 512k)*. . . 21.
MacChemistry. . . . . 89.
FWB Software
Hard Disk Backup *(protect hard disk info)* 39.
Hard Disk Partition *(speeds up hard disk)* 39.
Hard Disk Util *(program backup)* . . . . . 57.
Great Wave Software
KidsTime *(educational, ages 3-8)*. . . . . 29.
ConcertWare+ *(music composition)* . . . . . 29.
ConcertWare+ MIDI . . . . . 75.
Greene, Johnson
Spellswell *(60,000 word dictionary)* . . . . . 45.
Hayden Software
I Know It's Here Somewhere *(filer)* . . . . . 20.
Hayden:Speller *(for Word & MacWrite)* . . . . 27.
MusicWorks *(songs for your Mac)* . . . . . 46.
DaVinci Building Blocks *(req. MacPaint)* . . 46.
Home Design *(home planning tool)* . . . . . 49.
Score Improvement System for the SAT . . . 59.
VideoWorks & MusicWorks Bundle . . . . . 59.
DaVinci Commercial Interiors . . . . . 114.
Ideaform
MacLabeler *(print disk labels)* . . . . . 29.
Imagine
Smart Alarms *(DA reminder system)* . . . . . 39.
Industrial Computations
Powermath *(equation solving tool)* . . . . . 52.
Infosphere
MacServe *(network software)*. . . . . 249.
Innovative Data Design
Paste-Ease *(requires MacPaint)* . . . . . 35.
MacDraft *(new updated version, 512k)* . . . 179.
Kensington
Graphic Accents *(req. MacPaint)* . . . . . 29.
Type Fonts for Text *(16 new fonts)* . . . . . 29.
Type Fonts for Headlines *(req. 512k)* . . . . . 42.
Layered
Notes...For Excel or Jazz . . . . . 42.
Front Desk *(scheduling & organizer)* . . . . . 79.
Legisoft/Nolo Press
WillWriter 2.0 *(prepare your own will)* . . . . . 27.
Linguist's Software
Tech *(1000 different symbols)*. . . . . 59.
FOREIGN LANGUAGE FONTS
MacCyrillic . . . . . 39.
SuperFrench/German/Spanish . . . . . 39.

MacHieroglyphics, MacKana/Basic Kanji, MacSemitic/Coptic/Devanagari, MacKorean, MacArabic, MacGreek, MacHebrew *each* $59.
SuperGreek New Testament . . . . . 79.
LaserFrench/Greek/German/Spanish . . . . 79.
MacGreek/Hebrew/Phonetics . . . . . 89.
Living Videotext
ThinkTank 512k *(outline processor)* . . . . . 99.
More *(outlines, windows, & tree charts)* . . 159.
MacMemory
MaxRam & MaxPrint . . . . . 39.
MacroMind
M.U.D. *(Art Grabber+, CheapPaint)*. . . . . 32.
Magnum
Natural Sound Effects . . . . . 27.
Natural Sound Cable & Editor Disk . . . . . 89.
McPic - Volume 1 or Volume 2 . . . . . 29.
The Slide Show Magician 1.3. . . . . 35.
Manhattan Graphics
Desk Design *(2 volume set)* . . . . . 37.
ReadySetGo *(page processor, 512k)* . . . . . 99.
Ready,Set,Go!3 . . . . . 175.
Microsoft
Flight Simulator *(the Mac takes flight)*. . . . . 32.
Learning Multiplan and Chart *(2 disks)*. . . . 39.
Chart 1.0 *(42 chart styles)* . . . . . 72.
Basic 2.1 *(Basic language interpreter)* . . . . 89.
Multiplan 1.1 *(63 columns by 255 rows)* . . 105.
File 1.04 *(flexible data manager)*. . . . . 111.
Word 1.05 *(word processor, mail merge)*. . 111.
Multiplan to Excel Upgrade . . . . . 150.
Fortran 2.2 *(compiler)* . . . . . 169.
Excel 1.0 *(power spreadsheet)*. . . . . 225.
Miles Computing
Mac the Ripper *(2 disks, req. MacPaint)*. . . 27.
Mindscape
The Luscher Profile *(personality profile)* . . . 24.
The Perfect Score: SAT. . . . . 47.
ComicWorks *(create your own comics)*. . . . 49.
GraphicWorks *(newsletters, ads, posters)* 49.
Monogram
Forecast *(tax planning)* . . . . . 41.
Dollars & Sense *(home, small business)* . . . 81.
Nevins Microsystems
Turbocharger *(disk cache, req. 512k)*. . . . . 39.
New Canaan MicroCode
MDCFinder *(requires 512k)* . . . . . 20.
Mac Disk Catalog II *(requires 512k)* . . . . . 32.
Odesta
Helix *(req. 512k, external drive)* . . . . . 105.
Double Helix *(relational, custom menus)* 279.
Palantir
MacType, MathFlash or WordPlay . . . . . 26.
Inventory Control *(cost, sales & GP)* . . . . . 69.
inTalk *(communication to emulation)* . . . . . 79.
PBI Software
Icon Switcher *(customized icons)* . . . . . 14.
Icon Fun & Games or Business Libraries . . 14.
HFS Locater *(DA organizer for HFS)*. . . . . 27.
Hard Disk Backup *(supports MFS, HFS)* . . 29.
Peachtree
Back to Basics GL, AP, or AR . . . . . *each* 89.
Polarware
Graphics Magician *(animation)* . . . . . 39.
ProVUE Development
OverVUE 2.0 *(power-packed database)*. . 149.
Mail Manager Template . . . . . 29.
Personal Finance Template . . . . . 29.
QED Information Sciences
Typing Made Easy *(instruction)* . . . . . 35.

Circle 4 on reader service card

"To the goddess Bianu."

Long before there were Macintosh computers, humans discovered the value of symbols. They're simple, to the point, and they travel well. Just listen to Professor Warren Cook. He'll tell you how well they travel – he helped figure it out. On his Mac.



Professor Cook and a reproduction of an Ogam translation quiz he gave his class. Many of the Ogam inscriptions found in Vermont were prayers offered to the goddess Bianu.

Contest Winner #1

Name: Warren L. Cook, D. Litt., Ph.D.
Occupation: Professor of History and Anthropology, Castleton State College, Castleton, Vermont
System: Mac 128k
Application: Draws and compares ancient scripts and icons from the "Old" and "New World."

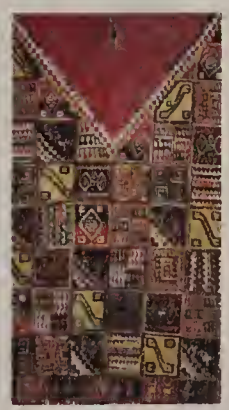
Now, it's a free country. Everyone is entitled to their own opinion about who discovered America – Columbus, Leif Erickson, Native American Indians, refugees from Atlantis. But it sure is interesting when Professor Cook points out the similarities he and Harvard Professor Emeritus Barry Fell are discovering between:

1. OGAM: Inscriptions found in ancient New England stone structures;
2. TOCAPU: Small square script found on Incan textiles and wooden vases: and;
3. CYPRIOT ALPHABET: Letters dating from the Bronze Age.

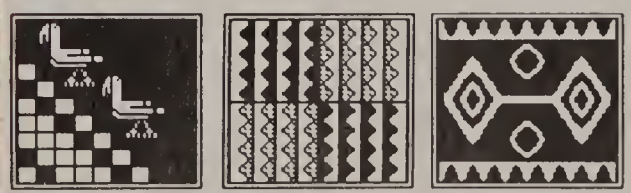
Mac smashes code!
First, Professor Cook travelled the world taking color slides of surviving Incan textiles and wooden bowls. Then he used the Mac to draw the Tocapus found on these artifacts. The Mac let him focus on details, create whole images from a single quadrant, and change dimensions in order to compare symbols on different size artifacts. Ultimately, he was able to print a "font" of these symbols which can readily be compared to other ancient alphabets and inscriptions.

Professor Fell of Harvard was the first to "translate" tocapus on modern textiles using an alphabet derived from ancient Cypriot script. Now Professor Cook is sending him his Mac renditions of ancient tocapu. They hope to prove that Phoenician masters in the Bronze Age sent Iberian subjects across the Atlantic looking for tin and copper, and left behind an alphabet which developed in the Americas.

What hidden meanings have you discovered on your Mac? Send us your story. You could win $500 in Mac products and instant fame!



Professor Cook uses his Mac to draw and compare symbols found on old Incan textiles.



"My Connection."

MacConnection™

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Down to ea

Rubicon Publishing
Silver Palate Collection *(NY's finest!)* . . . . $29.
Dinner At Eight *(recipes to wines)* . . . . . 32.
Dinner At Eight-Silver Palate Bundle . . . . . 54.
Satori
BulkMailer *(mailing lists)* . . . . . 75.
Sierra On-Line
MacOneWrite CD, AR, or GL. . . . . *each* 79.
Silicon Beach Software
Accessory Pak 1 *(useful utilities)* . . . . . 21.
Silicon Press *(printer utility, 512k)* . . . . . 42.
Simon & Schuster
The Mac Art Department *(req. MacPaint)* . . 24.
Paper Airplane Construction Kit. . . . . 24.
Typing Tutor III *(learn to type!)*. . . . . 35.
SoftStyle
Colormate Art *(Colormate images)*. . . . . 25.
Colormate *(color printing utility)* . . . . . 49.
Epstart *(Epson printer driver)* . . . . . 27.
Laserstart *(Hewlett-Packard Laserjet)* . . . . . 59.
Decision Map *(make better decisions!)* . . . 79.
Software Discoveries
Record Holder *(flexible data manager)* . . . 45.
Software Ventures
Microphone *(communications)* . . . . . 65.
Solutions, Inc.
Glue *(creates "print to disk" capability)* . . . 35.
Springboard
Art a la Mac Vol. 1-People and Places . . . . 23.
Art a la Mac Vol. 2-Variety Pack . . . . . 23.
Easy as ABC *(ages 3-6, letters)* . . . . . 29.
Early Games *(ages 2-6, shapes, counting)* 29.
State of the Art
Electric Checkbook *(print checks)* . . . . . 29.
Symmetry
Acta *(outline/writing desk accessory)* . . . . . 39.
PictureBase *(clip art manager, 512k)* . . . . . 45.
T/Maker
ClickArt Personal Graphics *(req. MacPaint)* 29.
ClickArt Letters or Effects *(req. MacPaint)* . . 29.
ClickArt Publications *(req. MacPaint)*. . . . . 29.
ClickOn Worksheet *(spreadsheet DA)* . . . . 46.
Target Software
MacLightning *(interactive spell checker)* . . 53.
Merriam Webster's Thesaurus . . . . . 29.
Telos Software
Business Filevision *(512k, external drive)* 199.
Think Educational
MacEdge II *(math & reading)*. . . . . 28.
Mind Over Mac *(5 challenging games)* . . . 28.
Think Technologies
Lightspeed Pascal. . . . . 89.
Lightspeed C *(C Compiler)*. . . . . 129.
TML Systems
TML Source Code Library . . . . . 59.
TML Pascal *(compiler, req. 512k)* . . . . . 69.

MacConnection Special of the Month
through December 31, 1986

I/O DESIGN MACLUGGAGE
Macinware Plus
Sturdy well-padded carrying case designed for the entire Macintosh Plus system including the external drive, HD 20, keyboard, mouse, cords and manuals.
Available in Navy Blue . . . . . $59.

Imageware II
Similar to the Macinware Plus in construction—high density foam and 1000 denure Cordura nylon. Designed to carry the Imagewriter II and a small supply of computer paper.
Available in Navy Blue . . . . . $49.

Macinware Plus-Imageware II Special
Buy both and save. With the selection of a Macinware Plus carrying case and the Imageware II printer case, your cost is only . . . . . $99.

TrueBasic
True BASIC *(fast, flexible & portable)* . . . . . 89.
Algebra, Pre-calculus, Calculus, Statistics, Trigonometry, 3D Graphics, Discrete Math, Probability & Chippendale utilities . . .*each* 36.
William & Macias
myDiskLabeler *(design & print labels)* . . . . 25.
myDiskLabeler w/color *(req. Imagewriter II)* 34.

GAMES

Activision
Championship Star League Baseball. . . . . 22.
Hacker *(you're on your own!)* . . . . . 27.
Mind Shadow *(Who am I?)*. . . . . 27.
Borrowed Time *(murder mystery)*. . . . . 27.
Shanghai *(Mah Jongg strategy)*. . . . . 27.
Alter Ego *(male or female version)* . . . . . 36.
Ann Arbor Softworks
Grid Wars *(3D graphic arcade)* . . . . . 22.
Artworx
Bridge 4.0 *(sharpen your skills)* . . . . . 21.
Bantam Electronics
Sherlock Holmes: Another Bow . . . . . 27.
Blue Chip
Millionaire *(stock market)* . . . . . 35.
Tycoon *(commodities)* . . . . . 35.
Baron *(real estate)* . . . . . 35.
Squire *(personal finance, req. 512k)*. . . . . 35.

Broderbund Software
Lode Runner *(over 150 levels)* . . . . . $24.
Ancient Art of War *(military strategy)*. . . . . 27.
Toy Shop *(create working models)* . . . . . 39.
Bullseye
Fokker TriPlane Flight Simulator . . . . . 35.
Electronic Arts
Skyfox *(3D graphics)* . . . . . 27.
One on One/Dr J vs Larry Bird *(req. 512k)*. . 27.
Pinball Construction Set. . . . . 27.
Epyx
Rogue *(strategy dungeon classic!)*. . . . . 24.
Winter Games *(Olympic events)* . . . . . 24.
Hayden Software
Sargon III *(9 levels of chess)*. . . . . 29.
Infinity Software
Grand Slam *(tennis, req. 512k)*. . . . . 28.
Infocom
Leather Goddesses of Phobos, Ballyhoo, Cutthroat, Hitchhiker's Guide, Planetfall, Wishbringer, Enchanter, Zork I, The Witness *(standard)* . . . . . *each* 23.
Zork II, Zork III, Sorcerer, Suspect, Mind Forever Voyaging *(advanced)* *each* 26.
Spellbreaker *(expert)* . . . . . 29.
Invisiclues *(hint booklets)* . . . . . .*each* 6.
MacroMind
Maze Wars+ *(play via modem or network)* 32.
Miles Computing
MacAttack *(3D tank simulation)* . . . . . 27.
Harrier Strike Mission *(3D flight simulation)* 27.
MacWars *(3D space simulation)*. . . . . 27.
Mindscape
Rambo: First Blood Part II . . . . . 24.
James Bond 007: "A View to a Kill" . . . . . 24.
James Bond 007: "Goldfinger". . . . . 24.
Stephen King's "The Mist" . . . . . 24.
Racter *(converse with your Mac!)*. . . . . 27.
Balance of Power *(world politics)* . . . . . 30.
Brataccus *(great graphics, req. 512k)* . . . . 30.
Uninvited *(mystery adventure)* . . . . . 30.
Deja Vu *(murder mystery)*. . . . . 33.
Origin Systems
Exodus: Ultima III *(fantasy adventure)* . . . . 38.
PBI Software
Strategic Conquest *(war strategy)* . . . . . 29.
Polarware
Transylvania, The Quest, Sword of Kadash, Xyphus, Crimson Crown . . . . . *each* 15.
Psion
Psion Chess *(3D and multi-lingual)*. . . . . 31.
QWare
Orb Quest *(graphic fantasy adventure)* . . . 29.
Sierra On-Line
Championship Boxing *(knock 'em out!)*. . . 25.
Ultima II *(role playing adventure)* . . . . . 35.

1-800/Mac&Lisa 650C

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MEMBER DIRECT MARKETING ASSOCIATION

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*Defective software replaced immediately. Defective hardware replaced or repaired at our discretion. Some items have warranties up to five years.

rth service.

Silicon Beach Software
Airborne! *(digitized-sound war game)* . . . $20.
Enchanted Scepters *(sound & graphics)* . . 21.
Dark Castle *(digitized sounds)* . . . . . 28.
World Builder *(create adventure games)* . . 42.
Simon & Schuster
Star Trek—The Kobayashi Adventure . . . . . 24.
Sir-Tech
Mac Wizardry *(high-rated adventure)* . . . . . 36.
Spectrum Holobyte
GATO *(submarine simulation)* . . . . . 26.
Orbiter *(requires 512k)* . . . . . 27.
Tellstar II *(No. & So. hemispheres, req. 512k)* 27.
Unicorn
Animal Kingdom *(ages 6-12)* . . . . . 27.
Decimal Dungeon *(math, ages 9 and up)* . . 27.
Fraction Action *(arcade style math game)* 27.
Mac Robots *(pre-school program)* . . . . . 27.
Math Wizard *(math games, ages 5-10)* . . . . 27.
Read-A-Rama *(reading, ages 5-8)* . . . . . 32.
Videx
MacGammon/Cribbage . . . . . 28.
MacVegas *(7 casino games)* . . . . . 34.

HARDWARE

Compucable
Mac Plus to Hayes Smartmodem cable . . . 17.
Mac Plus to Imagewriter II cable . . . . . 18.
Curtis Manufacturing
Diamond *(6 outlets)* . . . . . 29.
Emerald *(6 outlets; 6 ft cord)* . . . . . 36.
Sapphire *(3 outlets; EMI/RFI filtered)* . . . . . 47.
Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* 55.
Dove Computer
Mac Snap *(memory expansion units)* . . . . . call
Ergotron
MacTilt *(includes external drive bracket)* . . . 75.
MacBuffer 256k . . . . . 249.
MacBuffer 512k . . . . . 369.
MacBuffer 1 Megabyte . . . . . 569.
Hayes
Smartcom II *(communications software)* . . 89.
Smartmodem 1200 . . . . . call
Smartmodem 2400 . . . . . call
Transet 1000 . . . . . call
IOMEGA
Bernoulli Box *(dual 10-MB w/SCSI)* . . . . . 1895.
Bernoulli Box *(dual 20-MB w/SCSI)* . . . . 2395.
10 Meg cartridge . . . . . 51.
Kensington
External Disk Drive Cover . . . . . 8.
Mouseway *(mouse tracking pad)* . . . . . 8.
Mouse Pocket *(for your idle mouse)* . . . . . 8.
Mac (Plus) Dust Cover . . . . . 9.
Imagewriter (II) Dust Cover . . . . . 9.
AppleTalk Clips . . . . . 11.
Mouse Cleaning Kit w/Mouse Pocket . . . . . 17.
Universal Printer Stand . . . . . 18.
Disk Case *(holds 36 Mac disks)* . . . . . 19.
Disk Drive Cleaning Kit . . . . . 20.
Tilt/Swivel . . . . . 22.
Polarizing Filter 34
Surge Suppressor . . . . . 35.
Starter Pack *(includes Tilt/Swivel)* . . . . . 59.
A-B Box *(easily switches Mac Plus)* . . . . 65.
Control Center 65
System Saver Mac *(complete with fan)* . . 65.
Koala Technologies
KAT Graphics Tablet . . . . . 139.
MacVision Digitizer . . . . . 175.

Kraft
QuickStick *(Mac joystick)* . . . . . $45.
Mirror Technologies
FastPort *("SCSI" for your 512k Mac)* . . . . 139.
MagNet 20x External Drive w/cable . . . . . 939.
Magnum 20 Tape Backup . . . . . 929.
MagNet 30x External Drive w/cable . . . . . 995.
N² Products
Mac (Plus)-Printer cable *(6 feet)* . . . . . 19.
Mac Plus Adapter cable . . . . . 19.
Mac Plus-SCSI cable . . . . . 24.
Personal Computer Peripherals
MacBottom Hard Disk 20MB *(SCSI)* . . . . 879.
PKI
McD 800k External Drive . . . . . 199.
Summagraphics
MacTablet 6" x 9" *(stylus driven)* . . . . . 265.
MacTablet 12" x 12" *(sketching)* . . . . . 369.
Systems Control
MacGard *(surge protection)* . . . . . 55.
Thunderware
Thunderscan *(high-resolution digitizer)* . . 175.
Mac Plus Power Accessory . . . . . 29.
Western Automation
DASCH RAMdisk 1000k . . . . . 349.
DASCH RAMdisk 2000k . . . . . 399.

DISKS

Single-sided Diskettes

BASF 3½" Disks *(box of 5)* . . . . . 9.
Sony 3½" Disks *(box of 10)* . . . . . 17.
Verbatim 3½" Disks *(box of 10)* . . . . . 17.
MAXELL 3½" Disks *(box of 10)* . . . . . 17.
Fuji 3½" Disks *(box of 10)* . . . . . 17.
3M 3½" Disks *(box of 10)* . . . . . 19.

Double-sided Diskettes

BASF 3½" Disks *(box of 5)* . . . . . 14.
Sony 3½" Double-sided Disks *(10)* . . . . . 26.
Verbatim 3½" Double-sided Disks *(10)* . . . 26.
MAXELL 3½" Double-sided Disks *(10)* . . . 26.
Fuji 3½" Double-sided Disks *(10)* . . . . . 26.
3M 3½" Double-sided Disks *(10)* . . . . . 27.

INFORMATION SERVICES

Compuserve
Compuserve Information Service. 27.
Dow Jones
Dow Jones News/Retrieval Membership Kit 21.
Source Telecomputing
The Source *(subscription & manual)* . . . . . 30.

ACCESSORIES

Automation Facilities
Floppiclene Drive Care Kit . . . . . 15.
MacPak Complete Care System . . . . . 29.
Computer Coverup
External Disk Drive Cover . . . . . 4.
Imagewriter (II) Cover . . . . . 8.
Mac (Plus) & Keyboard *(two covers)* 10
Diversions
Underware Ribbon *(iron-on black transfer)* . . 9.
ColorPack *(includes Colorpens)* . . . . . 19.
Environmental Software Company
The Clutch *(holds 8 disks)* . . . 9.
MACATTIRE (Rip-stop nylon covers)
External Drive Cover *(400k or 800k)*. 7.

Numeric Keypad Cover . . . . . $7.
Numeric Turbo Cover . . . . . 8.
Imagewriter (II) Cover . . . . . 11.
Wide Imagewriter Cover . . . . . 13.
Mac (Plus) & Keyboard Cover . . . . . 15.
Laserwriter Cover . . . . . 17.
Mac (Plus) & HD20 & Keyboard Cover . . . . 18.
I/O Design
Imageware Wide *(132-column Imagewriter)* 49.
Imageware II . . . . . special
Macinware Plus . . . . . special
Innovative Concepts
Flip & File Micro *(holds 25 disks)* . . . . . 9.
Flip & File *(holds 40 disks)* . . . . . 18.
Innovative Technologies
The Pocket Pak *(holds 6 disks)* . . . . . 9.
The Easel *(holds 20 disks)* . . . . . 12.
The Disk Directory *(holds 32 disks)* . . . . . 18.
The Library *(carousel, holds 80 disks)* . . . . 29.
Kalmar Designs
Teakwood Roll-top Case *(holds 45 disks)* . . 15.
Teakwood Roll-top Case *(holds 90 disks)* . . 22.
Magnum
Mouse Mover *(let your mouse ride!)* . . . . . 14.
Moustrak
Moustrak Pad *(standard 7" x 9")* . . . . . 8.
Moustrak Pad *(large 9" x 11")* . . . . . 9.
Ribbons Unlimited
Imagewriter Color Ribbons . . . . . 5.
Imagewriter Ribbons Six Pack . . . . . 25.
Smith & Bellows
Mahogany Disk Case *(holds 90 disks)* . . . . 28.
Mac Plus Pack *(covers & disk case)* . . . . . 39.

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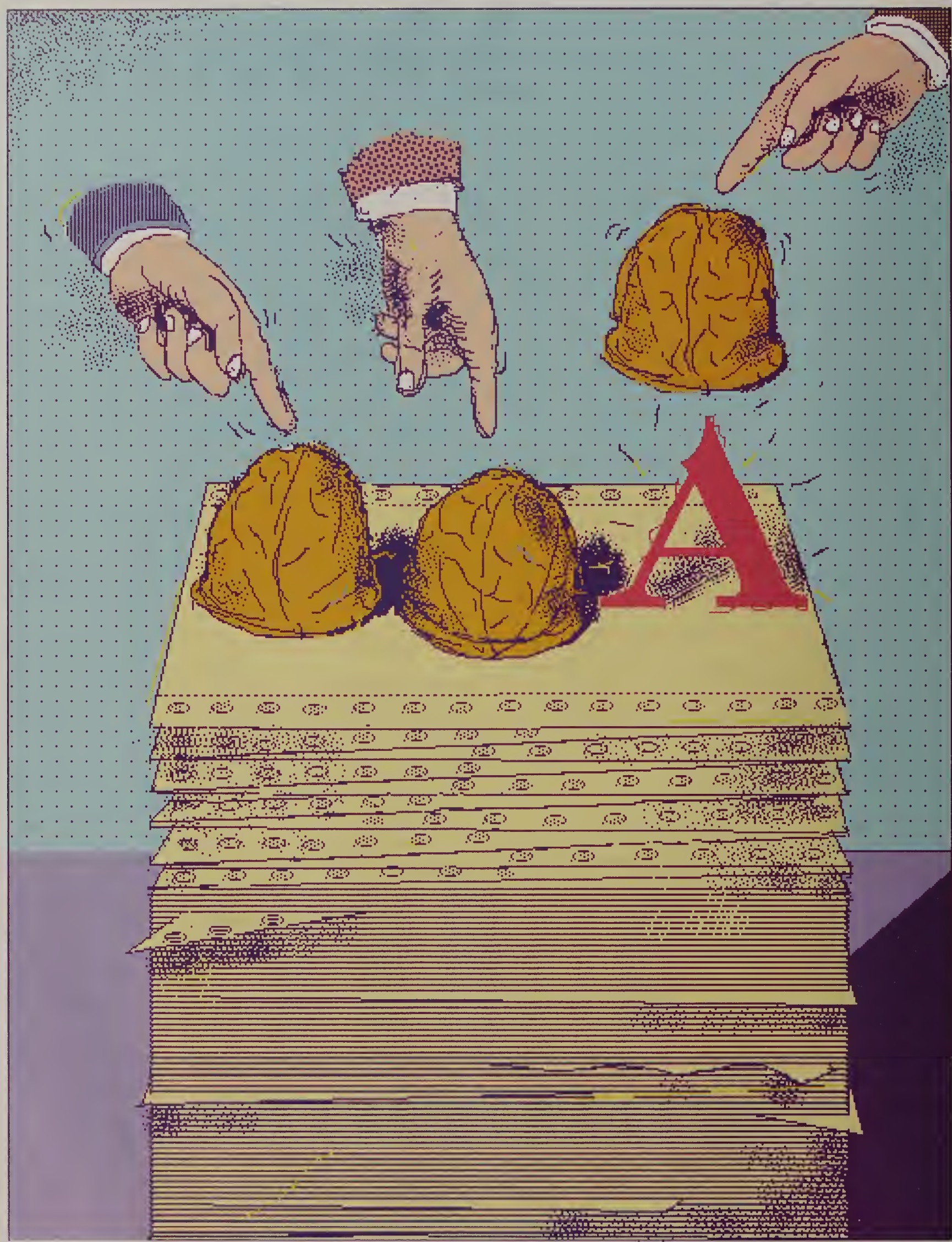
Circle 4 on reader service card



MARK ULRICH

Writing Your Own Ticket

Ten word processors for the Macintosh

by Daniel Farber

Since virtually all of us communicate with words, it's hardly surprising that word processing is by far the most popular personal computer application. Those of us who spend a lot of time writing must carefully evaluate word processing programs with our own particular needs in mind.

Until recently, though, word processors for Mac users were limited to *MacWrite* and *Microsoft Word.* But now a new wave of programs has arrived, all preserving the core of standard features first defined by *MacWrite:* word wrap, scroll bars, fonts and type styles, format rulers, and commands in the File and Edit menus. However, each program retains its own unique characteristics—from special capabilities like multiple columns and footnotes, to overall performance factors such as speed and ease of use. It's these individual qualities that lend a distinctive *feel* to the way each program interacts with the user.

Some—like *MacWrite, MindWrite,* and *Word Handler*—are fine for simple tasks like creating memos but generally lack the necessary features to format more complex documents. Others—like *Microsoft Word, HabaWord, Laser Quill,* and *WriteNow*—can adeptly handle complex documents, as well as simple writing assignments, without sacrificing ease of use. The word processor modules in *Jazz* and *Microsoft Works* offer still another approach, allowing you to work within an environment of integrated applications.

Choosing among such a wide variety of word processors can seem overwhelming. But the following overview of currently or soon-to-be-available word processors for the Macintosh should make the selection process a lot easier.

More Than Features Alone

Of the ten programs considered here, only *MacWrite, Microsoft Word* 1.05, and *Word Handler* were actually available at press time. However, the remaining eight prerelease versions should be out by now or in the near future.

Certain features—such as cut and paste, type-style options, and LaserWriter support—are not compared here since all ten programs offer them. And in the interest of sticking to basics, some seldom-used features were purposely omitted.

In making your own comparisons, note variations of flexibility and efficiency in the way different programs implement identical features. To help you interpret the table, features are divided into six categories: file handling and editing, formatting, type controls, graphics, utilities, and miscellaneous.

Use the table to help narrow down your choices. Where appropriate, footnotes qualifying specific program features are appended to the table. While a program may appear to have all the features you need, its feel at the keyboard might not turn out to be quite what you expected. Remember, the best way to evaluate a program is by taking a test drive to make sure you'll be comfortable with it over the long haul.

Program	HabaWord 1.0	Jazz 1A	Laser Quill 1.2	MacWrite 4.5	Microsoft Word 1.05	Microsoft Word 3.0	Microsoft Works 1.0	MindWrite 1.0	WriteNow 1.0	Word Handler 1.6
File Handling and Editing										
Windows open at once	memory	memory	4	1	4	16	10	12	memory	memory
Split windows	●[1]				●	●		●		
Zoom window	●	●	●		●	●	●	●		
Horizontal scrolling	●	●	●		●	●	●		●	●
Right margin width	14″	15″	14″	8¼″	21¾″	21¾″	15″	14⅞″	13″	12½″
Cursor keys	●		●		●	●	●	●		
Undo	●	●	●	●	●	●	●	●	●	●
Globally change fonts and type style	●					●			●	
Formatting										
Headers and footers	●	●	●	●	●	●	●	●	●	●
Footnotes					●	●			●	
Multiple columns	●		●		●	●			●	
Auto page numbering	●	●	●	●	●	●	●	●	●	●
Copy ruler or paragraph format	●	●		●	●	●	●	●	●	
Style sheets			●		●	●				
Time stamping	●	●	●	●	●	●	●	●	●	
Date stamping	●	●	●	●	●	●	●	●	●	
Binding margins	●		●		●	●			●	
Table of contents						●				
Index						●				
Type Controls										
Font sizes (in points)	4-153	9-36	4-127	9-24	4-127	4-127	9-24	9-24	4-127	9-24
Line spacing (in points or picas)	●		●		●	●				
Super- and subscript	●		●	●	●	●	●	●	●	
Kerning			●							
Hyphenation						●				
Soft hyphens	●		●						●	

● *A bullet indicates that a program does have the feature in question; a space means it doesn't.*

[1] Horizontal and vertical.

[2] Reads *MacWrite, Word, MacPaint, MacDraw,* and *SuperPaint;* writes *MacWrite* files.

[3] *Jazz* data only.

[4] Columns cannot be previewed on screen.

[5] Reads *MacWrite* files.

Program	HabaWord 1.0	Jazz 1A	Laser Quill 1.2	MacWrite 4.5	Microsoft Word 1.05	Microsoft Word 3.0	Microsoft Works 1.0	MindWrite 1.0	WriteNow 1.0	Word Handler 1.6
Type Controls (cont.)										
Decimal tabs	●	●	●	●	●	●	●	●	●	●
Show nonprinting characters					●	●			●	
Graphics										
Import graphics	●	●	●	●	●	●	●	●	●	●
Directly import graphics		●[3]					●[7]			
Wrap text around pictures			●				●			
Graphics in same line as text						●	●		●	
Utilities										
Glossary	●				●	●				●
Mail merge	●	●			●	●	●			●
Go-to-page option	●		●	●	●	●	●		●	
Metacharacter search			●		●	●			●	
Page preview	●					●				
Drawing tools						●	●			
Word count			●					●		●
Document history			●					●		
Spelling checker						●			●	
Outliner						●		●		
Background printing									●	
Switcher compatible	●	●	●	●	●	●	●	●	●	
On-line help						●	●	●		●
Read and write text files	●	●	●	●	●	●	●	●	●	●
File conversion	●[2]				●[5]	●[6]		●[8]	●[9]	●[10]
Miscellaneous										
Memory requirement	512K	512K	512K	128K	128K	512K	512K	512K	128K	128K
Copy protection		●	●		●		●			
Price	$199.95	$395	$199.95	$125	$195	$395	$295	$99	$175	$79.95

[6] Reads *MacWrite, Word 1.05, RTF, Word* (IBM PC), *DCA;* writes *MacWrite, Word 1.05, RTF, Word* (IBM PC), *DCA.*

[7] *Works* data only.

[8] Reads *MacWrite* and *ThinkTank;* writes *MacWrite* files.

[9] Conversion utility separate application; reads *MacWrite* and *Word.*

[10] Reads *MacWrite.*

Word Processing versus Desktop Publishing Programs

Word processors were once considered nothing more than glorified typewriters. Recently, though, the capabilities of word processors for the Mac have increased so dramatically that they now include many features once considered the sole province of code-oriented typesetting programs—like *PS Compose, MacTex,* and *Textures*—or the current crop of desktop publishing programs: *LetraPage, PageMaker, Ragtime,* and *ReadySetGo.* Conversely, desktop publishing programs are adding more text-editing features, putting those two applications on a converging path.

You may find this situation confusing, as you try to determine which program has the right set of features and the best price/performance value—-while still being easy to use. If you are somewhat baffled by all the variables, remember that the fundamental purpose of each type of program is quite different.

Since desktop publishing programs are oriented more toward the finished product, they're more complex and require more layout and design savvy. Generally, you bring text and graphics into a desktop publishing program from other programs and assemble those elements on the page. With desktop publishing programs, you must usually design page forms, specifying the exact dimensions of columns or laying out boxes on a *MacDraw*-like grid for holding text. But they let you wrap text around pictures and manipulate page layout with ease.

The formatting options available with most word processors, although somewhat limited, are adequate for most documents; if you want to create columnar text, you simply specify the number of columns, and the program formats the text appropriately. With desktop publishing programs, however, you have more precise type controls such as automatic kerning, hyphenation, and line- and word-spacing controls. Although there is some overlap between the two applications, the *feel* is not the same. They are still more like first cousins than siblings.

The ideal program for both designers and writers should be able to change its personality at will—providing on demand either a typewriter-like environment or an interactive layout environment. In the meantime, if you produce few documents with a heavy accent on design, go with one of the more capable word processors. On the other hand, if you turn out complex documents that require you to experiment interactively with the layout, you'll find a desktop publishing program more appropriate.

Highlighting the Pros and Cons

MacWrite 4.5 Because it was bundled with the Mac until less than a year ago, *MacWrite* became the de facto industry standard—more than adequate as an easy-to-use tool for documents that require a minimum of formatting. Because its modest features (by today's standards) were designed to run efficiently on a 128K machine, *MacWrite* performs better on the original Mac than more complex programs such as *Word* 1.05. However, the program can only open one document at a time and has a limited selection of font sizes. In addition, you must insert a new ruler each time you change formats. So if your requirements extend beyond simple reports, letters, or memos, you should probably opt for another program.

Microsoft Word 1.05 and 3.0 *Word*—until recently the only alternative to *MacWrite*—offers many advanced features familiar to writers using IBM PC word processing programs. The program has an impressive array of features, including shortcut text selection techniques, cursor key support, variable font sizes, footnotes, mail merge, extensive keyboard command equivalents, and binding margins. But in spite of its sophistication, *Word* 1.05's handling of certain tasks is cumbersome compared to other equally advanced newcomers. For example, columnar text cannot be viewed on screen, footnotes are not shown in the same window as the document, and formatting documents for printing can be confusing.

Microsoft's recently announced *Word* 3.0 adds many advanced features to the package and also corrects most of the structural problems that plagued the

program in the past. *Word* 3.0 includes an outliner and an 80,000-word spelling checker. It also performs math typesetting and hyphenation, as well as automatically generating tables of contents and indexes. You can create multicolumn documents with *Word* 3.0, but you still cannot edit multiple columns of text on screen. However, you can view up to two pages of columnar text at once in the page preview window.

Drawing tools allow you to create boxes, borders, and lines of various thickness. You can place annotations (which aren't printed) in documents for reference. The program sorts tabular information and can also perform calculations employing five basic mathematical functions: addition, subtraction, multiplication, division, and percentage.

Word 3.0's major innovation is a collection of style sheets that control character, paragraph, and section formatting—a feature that lets you save a collection of frequently used styles in a blank document for easy access. (*Laser Quill* offers the same option, but with less flexibility and power.)

Word 3.0 offers two levels of features: a simplified menu structure with capabilities similar to *MacWrite*'s to help novices get started, and a full menu structure, which lets you use the program's entire range of features. In addition, you can add or delete commands from certain menus, and assign more than a dozen options (for example, glossary names and styles) in a user-defined menu. The program also has extensive file conversion capabilities and lets you embed PostScript commands in documents.

Though *Word* 3.0 still lacks automatic repagination and kerning to round out its other desktop publishing capabilities, it does combine many of the features available on its IBM PC version with the graphics and ease of use of the Macintosh. Given its price, sophistication, and relative complexity, however, *Word* 3.0 isn't recommended for beginners.

HabaWord 1.0 Because of its flexible, intuitive options for formatting and printing text, *HabaWord* may prove less intimidating than *Word* for creating simple and some complex documents.

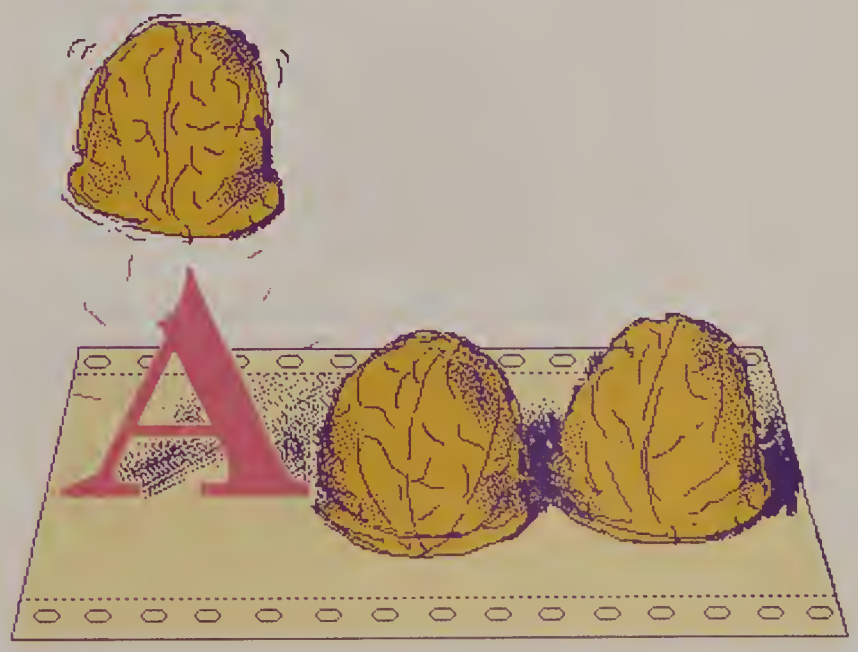
With *HabaWord,* you can easily create up to seven columns, which are controlled by a ruler. As you adjust the width of ruler settings for a particular column, the other columns are resized proportionally. In addition, column widths can be set independently of each other. *HabaWord* also lets you name rulers, so you can easily apply specific margin and tab settings.

Document windows split horizontally and vertically, so you can view up to four parts of a document simultaneously. A preview feature allows you to see up to four pages at once in a reduced view, and global changes can be made for type styles and fonts within a document. While *HabaWord* lacks footnoting capabilities, precision type controls, and a few utilities, it is still well designed for most word processing applications.

Laser Quill 1.2 Among the programs suited for professional writers, *Laser Quill* is the only one that takes an approach to formatting documents that's substantially different from the method first implemented by *MacWrite* (see *Reviews,* November 1986). Rather than specify formats individually (such as margins, tabs, indents, line spacing, alignment, type styles, and fonts), you define a set of those attributes as heading, paragraph, or highlight styles (for example, type styles such as bold, shadow, and superscript). The styles you define are available as menu options, and you can create style sheets by saving a document's style definitions in a blank document—a particularly useful approach for working with structured documents such as legal and technical papers.

Word 3.0 adds advanced features and corrects most of the structural problems.

Laser Quill lacks a few options you would expect to find—like a glossary and footnoting capabilities—but it offers useful type controls, including kerning (on a character-by-character basis), flexible page-setup controls, multicolumn text, and the ability to wrap text around pictures. If you like to experiment freely with typographic elements, however, you may find one of the other programs more appealing.



Keywords

Before you begin shopping for word processing software, you should know the special terms related to producing documents with computers. This glossary defines some of the less intuitive terms represented in the comparison table.

Background printing Allows you to continue working on the Macintosh while you print documents on the ImageWriter.

Binding margins Used to reserve space for printing bound documents; binding margins appear on the left and right sides of the page only when a document is printed.

Copy format Lets you copy the format (margins, tabs, indents, fonts, type styles, alignment, and line spacing) of one paragraph (or ruler) to another block of text.

Document history Statistical information about a document, such as number of words or lines and time spent creating the document.

File conversion The capability to convert documents to text (ASCII) files or directly to the format of another word processor.

Font A particular type style's set of characters, such as 12-point Times Roman.

Glossary Allows you to specify abbreviations for commonly used words and phrases, which can be expanded with a single keystroke.

Kerning Adjusting the space between specific characters to create more even letter spacing.

Leading A measure of line spacing, usually in points, from the top of one line to the top of the next.

Mail merge Allows you to create form documents with variable fields, such as name and address, or merge data automatically into word processing documents when printing.

Metacharacters Symbols representing nonprinting characters or a range of characters (such as uppercase or a set of only vowels) that can be used in search queries.

Nonprinting characters Characters—such as spaces, returns, tabs, and page breaks—that appear as blank spaces in documents when printed.

Page preview Provides a view of the full page (or pages) in a reduced view, as in *MacPaint*.

Point Approximately 1/72 inch, or 1/12 pica, the standard unit of measure used in layout and typesetting.

Soft hyphen (also known as **discretionary hyphen**) A hyphen visible only when words are split across two lines of text.

Style sheets Blank documents that have preset formats such as fonts, headers, footers, and paragraph and heading styles. These are useful for working with structured documents.

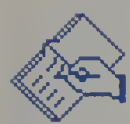
MindWrite 1.0 *MindWrite* is a combination outliner and word processor. With the primary emphasis on outlining, it's geared to people who like to organize their thoughts within a hierarchical structure. In addition to all the important outlining features—including automatic renumbering and table-of-contents generating—this program's word processing options also give you the formatting flexibility of *MacWrite*. Shifting back and forth between the outliner and word processor is easy, and you can include multiple outlines within a document.

MindWrite has some useful utilities, including one that lets you launch another application from within the program; others let you mark items that have been modified between specified dates, split windows, and access numerous keyboard shortcuts.

If you want an outliner but need to produce more complex documents than the program can handle, you can copy *MindWrite* outlines to another word processor or use desk accessory outliners that work with any Mac word processor, such as *Acta* and *Voila!*.

Word Handler 1.6 Modestly priced *Word Handler* 1.6 more closely resembles *MacWrite* than *Word* 1.05, although it incorporates features from both products (see *Macware Reviews,* October 1986). The program has *MacWrite*'s simplicity and ease of use—in avoiding the overuse of dialog boxes, for example—but lacks the formatting and type control features of *Word* and some other programs.

Word Handler lets you open several documents at once and has a glossary feature, a simple form-letter generator, and some useful utility options, including Word Count and Delete Document. This latest version of the program enables you to import graphics via the Clipboard. But *Word Handler* is still slower than the other programs in performing common tasks like scrolling or cutting and pasting text, and the Undo option doesn't work properly. If your word processing needs are relatively simple, however, *Word Handler* may suffice as an entry-level program.



WriteNow 1.0 More than any other program considered here, *WriteNow* upholds the utilitarian virtues of *MacWrite* while adding advanced features to the formula. Like *HabaWord, WriteNow* is useful for composing short, simple documents as well as more ambitious projects like technical manuals and research papers.

The program displays up to four columns and footnotes on screen and lets you embed graphics within sentences or paragraphs. *WriteNow* is fast, and each feature has a refinement that improves the overall feel of the program—so that even creating autonumbered footnotes becomes a simple matter. Although *WriteNow*'s ability to undo any action may not seem remarkable, few other programs offer such a high-level Undo capability. *WriteNow* also includes a built-in 50,000-word spelling checker, which is also fast and accurate. In spite of these advantages, the program does lack a few features desired by many writers—most notably cursor key support and mail merge. Another shortcoming is its inability to save documents as text from within the program.

Jazz 1A A program that integrates spreadsheet, graphics, database, word processing, and communications modules, *Jazz* 1A is designed for people who regularly include charts, spreadsheets, and database information in their reports and presentations.

The key feature of *Jazz* is its ability to dynamically link data from a source application to a word processing document. For example, if you alter figures from a spreadsheet that's within a word processing document, the changes are reflected automatically in that document.

Jazz's word processor functions like *MacWrite,* but document length is limited to about 17 pages. If you must frequently include spreadsheets and graphs in your reports or memos, and you use simple document formats, take a closer look at *Jazz* 1A.

Microsoft Works 1.0 Like *Jazz, Works* is an integrated program (see "Microsoft's New Works," October 1986). However, *Works* doesn't maintain live links between source documents and word processing documents. Instead, you integrate data using the copy-and-paste method (except with mail merge). Any link to the source material is severed when the information is copied onto the Clipboard. *Works'* word processing most closely resembles *Microsoft Word.* While it lacks many of the advanced features of *Word* 1.05 and some of the other word processors, it has a few of its own that the others should include.

Works treats graphic data differently than other Macintosh word processors. In other programs, because graphics occupy the entire space across a page, you cannot enter text inside that area. But in *Works,* graphics are treated as overlays above the text, as if they were transparencies. You can enter text on any line within a graphic or even wrap text around an illustration. In addition, the program lets you draw lines and borders around text or graphics. Overall, *Works* is a solid word processor in its own right and becomes especially attractive if its other modules happen to fit your needs.

A Look to the Future

Trade-offs are inevitable whenever you must choose among so many diverse programs. So even as current programs are revised and new ones developed, this problem will not be solved until a construction set is developed that lets you customize a word processor by combining just the features you need.

Meanwhile, expect word processing programs to adopt more desktop publishing features. Some already offer many of the options necessary for producing books or reports with multiple columns of text and graphics, but they still lack hyphenation, kerning, indexing, and more interactive page-layout capabilities. Similarly, expect desktop publishing programs to include more text editing capabilities. Eventually, you'll be able to write your own ticket—using one program to turn out a simple memo or produce a multicolumn 400-page dissertation. □

The Macintosh Data Exchange

by Prasad Kaipa and Edwin Haskell

Need to transfer data? Here's a look at ways you can move data between programs and machines.

The ability to combine elements from various documents into a single report is one of the Macintosh's strengths. But merging elements from different applications is often not as straightforward as it seems. Although you can transfer text, numbers, and graphics between applications using the Clipboard, even with the simplest data transfers difficulties sometimes arise.

There are three types of transfers: between applications, between Macs, and between a Mac and a word processing machine or another computer. Each type of transfer has unique problems. The simplest procedure is to transfer text or graphics from one application to another. Transferring files between Macs and other computers generally requires a cable, modem, or AppleTalk network.

Data Transfer Basics

The three tools for transferring data between applications are the Clipboard, the Scrapbook, and the Notepad. The Clipboard acts as a temporary holding area for text, numbers, or graphics. Whenever you cut or copy data, it goes onto the Clipboard. You can paste the Clipboard's contents elsewhere in the same file or into another file created with the same or a different application.

The Scrapbook automatically stores data that has been cut or copied with the Clipboard. Like the Clipboard, it retains format information. While the Clipboard can store only one set of data, the Scrapbook can transfer multiple data items from one file to another.

The Notepad, as its name implies, is a simple memo processor capable of storing and manipulating small amounts of unformatted text. You enter text into the Notepad from the keyboard or the Clipboard. However, such text does not retain formatting information.

To Format or Not

Most data-transfer problems result from incompatible data formats. Suppose, for example, that you wish to transfer information from *Microsoft File* to an *Excel* worksheet with the *Switcher*. You copy the desired File record onto the Clipboard, but when you switch to *Excel* and try to paste the record into the worksheet, you get a message that the data is in the wrong format. However, if you paste the *File* data into the Scrapbook first, you can choose to save the data in an unformatted form. You can then copy and paste the unformatted data into an *Excel* document. Once you save the unformatted Scrapbook data, the Clipboard data will also be unformatted, so you can paste the Clipboard data directly into the worksheet.

Other applications give you similar formatting options when you paste data into the Scrapbook or quit. Being aware of

Many applications allow you to open application-specific files created by other programs.

these options helps if you have difficulty transferring information between applications.

Choosing Formats

Some applications can read and write more than one file format. The two main format types are application-specific and transfer. Application-specific formats are meant to be read only by the application that created them, while transfer formats are meant to be read by many applications.

The common transfer formats are SYLK, WKS, PICT, bit map, and text. SYLK files, originally used with Microsoft's *Multiplan* spreadsheets, contain text as well as formula and formatting information. Similarly, the WKS format used by Lotus's *1-2-3* on the IBM PC encodes both data and formulas but is not compatible with Lotus's *Jazz* format. PICT files created by applications like *MacDraw* contain information for drawing the objects in a picture, whereas bit-mapped files, such as those created with *MacPaint,* contain information on the individual points that make up a picture. Text files, which have the simplest transfer format, contain ASCII codes for the text from applications like *MacWrite* and *Word.* Text files, however, contain neither formatting information, such as margin and tab settings, nor font or character attributes, such as boldface and italics. The degree of compatibility between different data types and applications varies (see Table 1).

Importing and Exporting Data

Many applications allow you to open application-specific files created by other programs. *Microsoft Word,* for example, can open files created by *MacWrite* and can convert them to *Word* format. *Excel* and *Jazz* can open files from *Multiplan, Chart,* and *1-2-3.*

Many database applications import files created by other database programs and export files to other applications. *dBase Mac, Double Helix, Omnis 3 Plus,* and *Business Filevision* all have extensive import and export capabilities.

You can always transfer text files between databases as long as the two applications can save and read data in text format. Most databases can read text files that contain field and record delimiters, such as commas, spaces, quotation marks, and tabs. However, many databases cannot transfer the record-formatting information and graphics fields.

Glue, from Solutions, provides its own format for saving images created in applications like *MacDraw, MacPaint,*

Tips for Data Movers

Here are some general tips for using the Clipboard and the Scrapbook to transfer data.

Estimating Clipboard Size
The Clipboard is written to disk whenever an application requires more memory space; therefore, the space available on the start-up disk limits the maximum size of the Clipboard. With a 512K Macintosh running System 2.0, the maximum Clipboard size is only 32K bytes, regardless of the application. Some applications impose specific limitations. For example, *MacProject* converts Clipboard information into a picture file that may not exceed 32K bytes. And *Multiplan* has problems starting up with a large Clipboard file on the start-up disk.

Changing Data
While you can store virtually any type of information on the Clipboard, some applications do not paste and retrieve information accurately from the Scrapbook. For example, circles and rectangles (with or without rounded corners) can get larger after being copied and pasted into the Scrapbook and then put back into *MacDraw* 1.7.

Freeing Memory
If you're having problems caused by insufficient memory, check the Clipboard to see if it contains unneeded data. (Whatever was last cut or copied remains on the Clipboard until you cut or copy more data.) You can free space by copying a single character, which will clear the Clipboard of all but that character.

Saving Disk Space
Storing files in transfer formats can save disk space. SYLK files, for instance, are usually much smaller than the application-specific files created by *Microsoft File* or *Excel*. We recently created an *Excel* file containing several large tables; it required close to 300K bytes of disk space. Saving the same file in SYLK format required only 9K bytes. You can also conserve space by saving *MacWrite* or *Microsoft Word* files in text format.

Scrapbook Index
Keeping track of the Scrapbook contents becomes increasingly difficult as the number of entries increases. One way to track the Scrapbook's contents is to create an index of the entries with a word processor like *MacWrite, Word, Notepad Plus,* or *MockWrite*. Paste the index into the first page of the Scrapbook, and then update the index as you add or delete entries.

Useful Desk Accessories
Several desk accessories allow you to create or transfer data while working in an application. Such accessories include *Art Grabber* and *Aristo* for *MacPaint* files and *Mini Edit* and *MockWrite* for text files.

Microsoft Chart, or *Excel*. Once the images are saved in a *Glue* document, you can look at the images without the original application, and you can cut or copy the images to other documents just using the Clipboard and the Scrapbook.

Unlike spreadsheet and graphics applications, there is no standard format for transferring formatted text. However, Microsoft confirmed that it's working on such a transfer format for use with *Word*.

Crossing Party Lines

Transferring files between different machines, whether they're Macs or IBM PCs, involves two steps. First the information must be sent from one machine to the other over a cable, a modem, or a local area network. Alternatively, the information can be converted on disk to the proper disk format. Either way, the second step involves filtering the data or converting it to the proper file format, so that the intended application can read it.

DataViz's *MacLink* and *MacLink+* solve both the transfer and the filtering problems with a combination of hardware and software. *MacLink* and *MacLink+* contain a serial card for the PC and a cable that connects the PC to the Mac's printer or modem port. Both *MacLink* and *MacLink+* have software that lets you transfer files via modem or cable as well as convert between file formats on the IBM PC and the Mac (see Figure 1). Versions of *MacLink+* that convert NBI and Wang word processor files are also available.

Abaton and Dayna Communication apply the disk conversion approach to the file transfer problem. Abaton's Drive 5.25 consists of an external 5¼-inch disk drive that connects to the Mac's serial port. At press time, Abaton was preparing to ship software that allows the Drive 5.25 to attach to the Mac Plus's SCSI port. The Drive 5.25 reads PC-formatted disks as well as CP/M disk formats. In fact, running the Drive 5.25 as a stand-alone CP/M computer allows you to read Osborne, Kaypro, CP/M 86, or any other CP/M computer data. Currently, Drive 5.25 provides limited filtering for both PC data disks and CP/M data disks.

Dayna Communication's recently announced FT100, like the Abaton Drive 5.25, consists of an external 5¼-inch disk drive that connects to either the SCSI or the serial port. Currently, the FT100 has no filtering capabilities; however, Dayna was preparing to ship a version with filter options

Table 1

	TEXT	SYLK	PICT	BIT MAP	Comments
Business Filevision	C, P, O, S		C, P	C,* P	Reads and writes text files
Cricket Graph	C, P		C, P		Reads Statworks and text files
dBase Mac	C, P, O, S		C, P	C, P	Reads and writes dBase II and III files as well as text files
dMac III					Reads and writes dBase II and III files as well as text files
Double Helix	C, P, O, S	O, S	C, P	C, P	Reads text files and stores graphics
Jazz	C, P, O, S	O			Reads SYLK, WKS, and Symphony formats
MacCalc	C, P	O, S			Reads and writes SYLK and WKS formats
MacDraft	C, P	O, S	C, P, O, S	C,* P	
MacDraw	C, P		C, P, O, S	C,* P	
MacPaint	P		P	C, P, O, S	
MacProject	C, P		C		
MacWrite	C, P, O, S		C, P	C, P	
Microsoft Chart	C, P	O, S	C		
Microsoft Excel (Chart)	C, P	O	C		Reads and writes Chart files directly
Microsoft Excel (Wksht)	C, P, O, S	O, S			Reads and writes 1-2-3 and Multiplan files
Microsoft File	C, P, O, S		C,* P	C,* P	
Microsoft Multiplan	C, P, O, S	O, S			
Microsoft Word	C, P, O, S		C,* P	C,* P	Reads MacWrite files directly
More	C, P, O, S	C, P	C,* P	C,* P	Reads and writes Word, MacWrite, ThinkTank (IBM and Mac), and Ready (IBM) formats
Omnis 3 Plus	C, P, O, S	O, S			Reads and writes text files
ThinkTank 1.20	C, P, O, S		C,* P	C,* P	

C = Cut, P = Paste, O = Open File, S = Save File

*Cannot be created in application.

as this article went to press. Dayna also manufactures MacCharlie, which, in addition to transferring files, lets you run MS-DOS-based programs.

Altertext's Document Conversion System, a high-end disk-conversion product, offers hardware and conversion software that converts word processing files from over 100 different disk and word processor formats into fully formatted *Microsoft Word* documents for the Mac.

Network Connections

PCs and Macs on an AppleTalk network share files by using distributed network software. Centram's *TOPS* and Infosphere's *MacServe* with Tangent Technologies' *PC MacServe* are AppleTalk solutions that let you transfer files between PCs and Macs over the AppleTalk network. *TOPS* lets you transfer files directly between machines, while *MacServe* allows you to save files in partitioned areas of a shared hard disk. Neither *TOPS* nor *MacServe* currently offers file-filtering capabilities; however, both work with *MacLink* or *MacLink+*.

If you need to transfer files to an Ethernet-networked machine, FastPath from Kinetics and *Ultra-Office* from Lutzky-Baird provide two solutions. FastPath is a bridge that connects AppleTalk to Ethernet. UNIX or VMS hosts running Kinetics' *K-Talk* software can send and receive AppleTalk files via the Ethernet-AppleTalk pathway. File filtering can be done on the host end or on the Mac with a program like *MacLink+*.

Lutzky-Baird's *Ultra-Office* lets Macs connect to machines running the UNIX or XENIX operating system. *Ultra-Office* host machines include the IBM PC AT, AT&T 7300 PC, Sun Workstation, and Convergent Technologies' MightyFrame. While *Ultra-Office* currently provides limited filtering capabilities, Lutzky-Baird plans to include translator software that will allow users to choose different formats. □

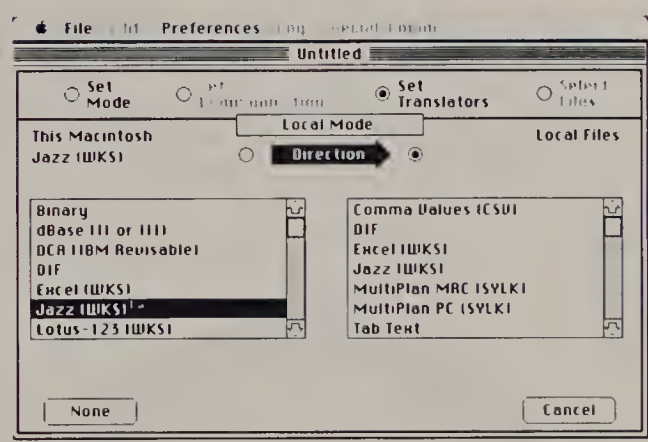
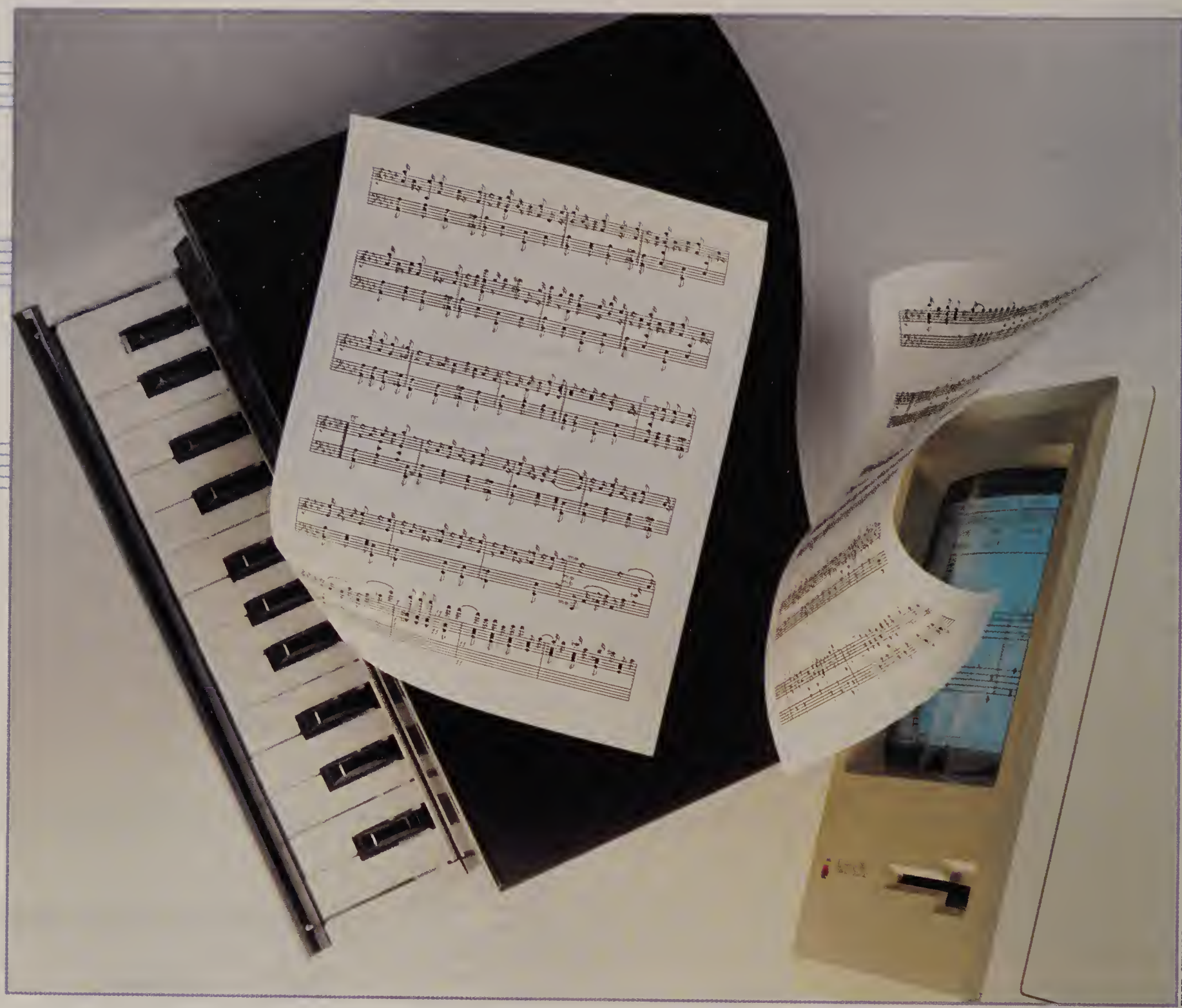
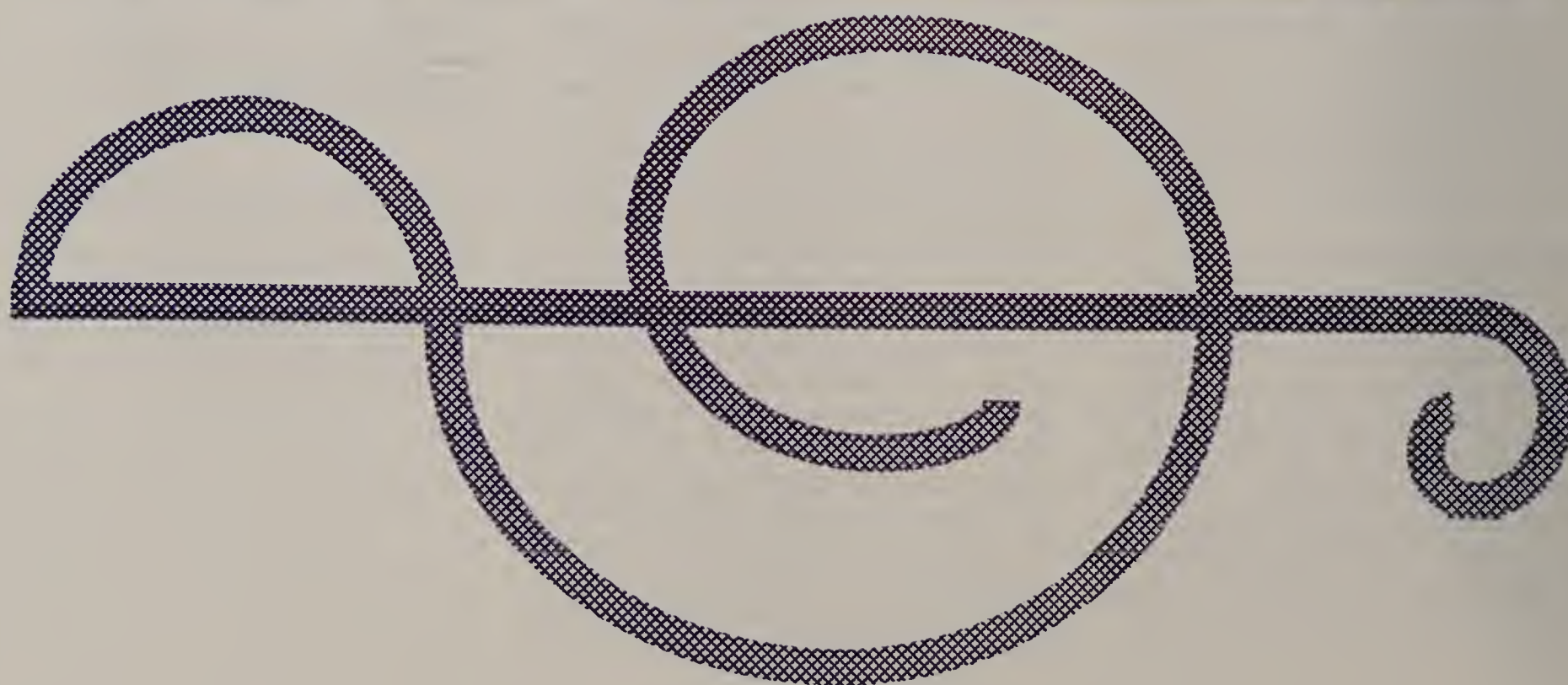


Figure 1
MacLink+ *lets you easily transfer data between two Macs or between a Macintosh and an IBM PC. Once you've selected a file on a drive and chosen the format to which you want the file converted,* MacLink+ *filters the data*



FRED STIMSON



From Keyboard to Score

An introduction to music processing and evaluations of six packages that put your performances on paper

by Christopher Yavelow

The age of music processing is dawning, and the birth of desktop music publishing is imminent. For the first time, a person can sit down at a musical keyboard, play a tune, see the performance in conventional music notation on a computer screen, make any necessary changes, and print the music out in publisher-quality notation.

Whether your studio consists of a Casio CZ101 with headphones or a Kurzweil 250 with a roomful of outboard gear, if you're interested in music processing the one piece of equipment you probably won't leave out of your setup is a Macintosh. With close to five dozen music software packages available, the Macintosh has established itself as the industry standard for composers, arrangers, sound designers, and performers. If you already have a Macintosh and an ImageWriter printer, all you need to get equipped for music processing is a MIDI keyboard, a MIDI interface, and a notation program—about a $500 investment. Of course, if your needs are sophisticated, you may have to spend more than that just on software.

Music Processing

Believe it or not, most published music is still produced by hand, the favored methods being pen and ink, transfer process (rub-off characters), and music typewriters. The music industry, however, is transforming itself almost overnight. According to a study of the music business by the Center for Computer Assisted Research, in Menlo Park, California, the next three to five years will see an almost complete conversion from manual techniques to computer typesetting of music.

The music processing revolution is occurring now because technology has finally advanced to the point at which the requisite tools are generally affordable. Music processing depends highly on WYSIWYG (what you see is what you get) graphics, which is where the Macintosh fits in. The other pieces of the puzzle are low-cost laser printers and a versatile page-description language, PostScript.

A final development that has paved the way for desktop music publishing was the release this past fall of Adobe Music Systems' PostScript music font, Sonata. Unlike earlier, bit-mapped fonts, Sonata defines symbols as *vectors*—a series of points connected by lines—or *Bezier curves,* curved lines connecting midpoints and endpoints (similar to splines). The main advantage of PostScript's device-independent approach is that it lets you choose the font size and the printer upon output. Currently, Adobe's library of musical

symbols runs on the Apple ImageWriter (160 dots per inch, or dpi), the LaserWriter (300 dpi), and the Mergenthaler Linotronics phototypesetters (1270 and 2540 dpi).

Integrated versus Modular

There are several ways to tackle the keyboard-to-score problem. The ideal method would be a completely integrated package that would allow recording and interactive editing of both performance information (MIDI data) and notational graphics. A system of this kind would know a lot about music notation and would be able to make accurate decisions in many situations. Extensive interactive editing features would accommodate the vast amount of contextual information not transferred via MIDI. Above all, the notation software should be more efficient than manual labor.

The only product that comes close to fulfilling these criteria is John Maxwell and Severo Ornstein's Mockingbird. Like many of the more advanced products developed at Xerox PARC, Mockingbird probably won't be made commercially available in the near future, if ever.

Of the four commercial packages that try to integrate MIDI sequencing and notation, Great Wave's *ConcertWare+ MIDI* is the only one to achieve satisfactory results—but at the expense of power and editing features.

Southworth Music's attempts to integrate notation and sequencing in its *Total Music* package have met with little success. Although repeated updates have brought the company's sequencer to a level well beyond most others, the notation portion of the package remains virtually useless.

MacroMind has developed a MIDI version of its popular *MusicWorks* program, although as of this writing it had not been officially released. While *MusicWorks MIDI* integrates sequencing and score editing, its restriction to four monophonic voices and its limited file size and symbol repertoire preclude most serious applications.

Electronic Arts' *Deluxe Music Construction Set (DMCS)* comes closest to the perfect integration of MIDI and notation. Since it doesn't accept real-time input, however, including it with the integrated packages would be stretching a point.

The alternative to integrated packages is the modular approach, in which one program captures MIDI data from a performance and another handles notational graphics. This approach seems to be the most promising one for the Macintosh. Currently, Opcode's *MIDIMAC Sequencer* has options to save files in the formats of both *DMCS* and Mark of the Unicorn's *Professional Composer*. Musicworks' *MegaTrack* can export files to *DMCS* using its *MIDIWorks* file-conversion utility. And Mark of the Unicorn's *Performer* MIDI sequencer transfers files to and from the same company's *Professional Composer* application.

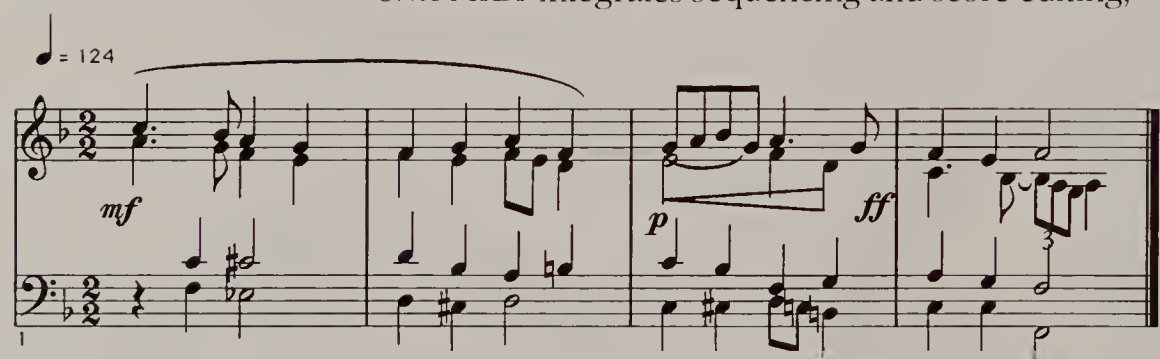


Figure 1
Typical DMCS *LaserWriter output using Adobe Systems' PostScript music font, Sonata. The passage was input in step time, and some symbols were added with the mouse. Most of the symbol collisions in measure 3 could have been avoided by careful mouse placement, but the number 3 in measure 4 could not be moved. Notice that the customary brace is missing from the far left border of the staff; it's also missing from* DMCS's *character set.*

Real Time versus Step Time

Getting data into a notation program, or into the notation portion of an integrated package, can be accomplished in three ways. The first method is to enter the notes on the Macintosh screen manually. The other methods, *step-time* and *real-time* input, use a musical keyboard and thus come closer to fulfilling our expectations about music processing.

Step-time input is a process whereby you specify a rhythmic value and then play the pitches on a synthesizer keyboard. The rhythm or speed at which you enter the notes has no effect on the rhythmic values entered into the software. The music in Figure 1 was entered in step time and is therefore free of the types of errors typically found in notation derived from real-time input.

Real-time input refers to data that has been obtained from an actual musical performance. The performance may be at any speed, as long as the relative durations of notes are maintained. The most common way to capture real-time input is to use a MIDI-equipped synthesizer and a software-based sequencer.

Quantization

Since it is not possible—or even desirable—to play with perfect rhythm, quantization is an essential feature in any notation program that accepts real-time MIDI data. (Figure 2 shows the results of an unquantized performance.) There are three ways to accomplish this rhythmic rounding off: incoming data can be quantized as it is captured (as in *ConcertWare+ MIDI*); MIDI data can be quantized on output, leaving the original performance data intact (as in *MIDIMAC Sequencer*); or various quantizations of the raw data can be tested before the quantized version is written to disk (as in *Performer*).

The disadvantage of quantizing on input is that the original nuances of performance can never be recreated. Furthermore, you must specify the smallest

rhythmic value in a performance in advance. Very often this value is either unknown or so infrequent that making it the basic unit of a quantization grid for an entire passage results in the rounding off of larger rhythmic values with too much precision.

Quantization on output is appropriate when you're using MIDI data to control a synthesizer. This method serves the purposes of notation only if the program includes a provision for capturing quantized data to disk or some other option for rounding off data to usable rhythmic values. Opcode's *MIDIMAC Sequencer* provides several ways to get around its quantization-on-output design.

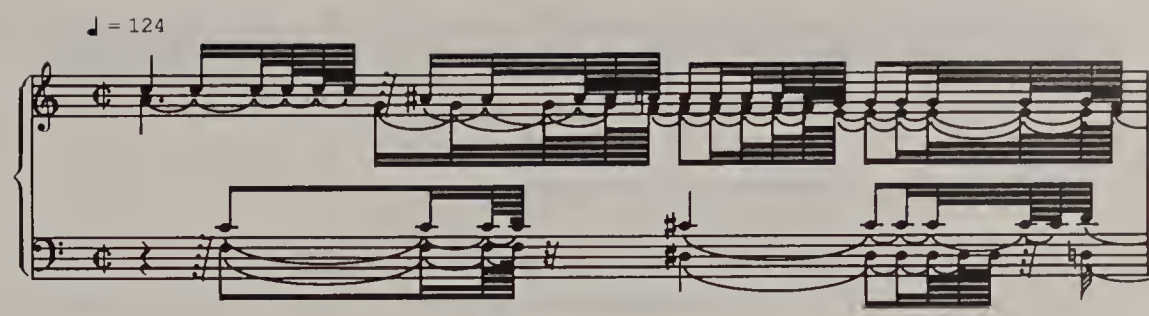
Testing a variety of quantizations before committing one to disk seems to be the best approach. *Performer* goes one step further by allowing you to apply many different types of quantization to a single track at different locations.

Editing

Although all notation programs offer some degree of rule-based automatic transcription, a certain amount of hand finishing will always be required, because MIDI has no provision for communicating information that is not relevant to performance data. For example, the MIDI standard does not distinguish enharmonic representations of equivalent pitches (similar to homonyms in text). Algorithms can guess whether a note should be written as a sharp or a flat, but almost all music programs require the user to specify what key the piece is in, and no program guesses correctly 100 percent of the time. Managing colliding symbols is another function that cannot be fully automated. With this in mind, it's important that symbols be "draggable," as they are in *MacDraw* or *MacPaint*. *DMCS* is currently the only notation program with this capability.

The way a program lets you specify a region for editing has a profound effect on the type of music you produce. Because music exists in two dimensions, horizontal and vertical (melodic and harmonic), you should be able to select regions for editing that encompass any range of horizontal and vertical material. Only *Performer* and *DMCS* currently provide this ability. Additional selection criteria that should be part of all sequencing and notation packages include the ability to specify all notes in a region of a given duration, loudness, or pitch range. Only *Performer* and, to a limited extent, *MIDIMAC* include these selection features.

Unfortunately, none of the packages include inherently musical criteria like selection based on metrical placement (for example, "every first beat") or inclusion or exclusion within a specified set of pitches. Another feature conspicuously absent from currently available packages is discontinuous selection. Because it's the nature of music to include aspects of repetition separated by contrasting material, the ability to edit noncontiguous but similar material automatically would be a significant plus.



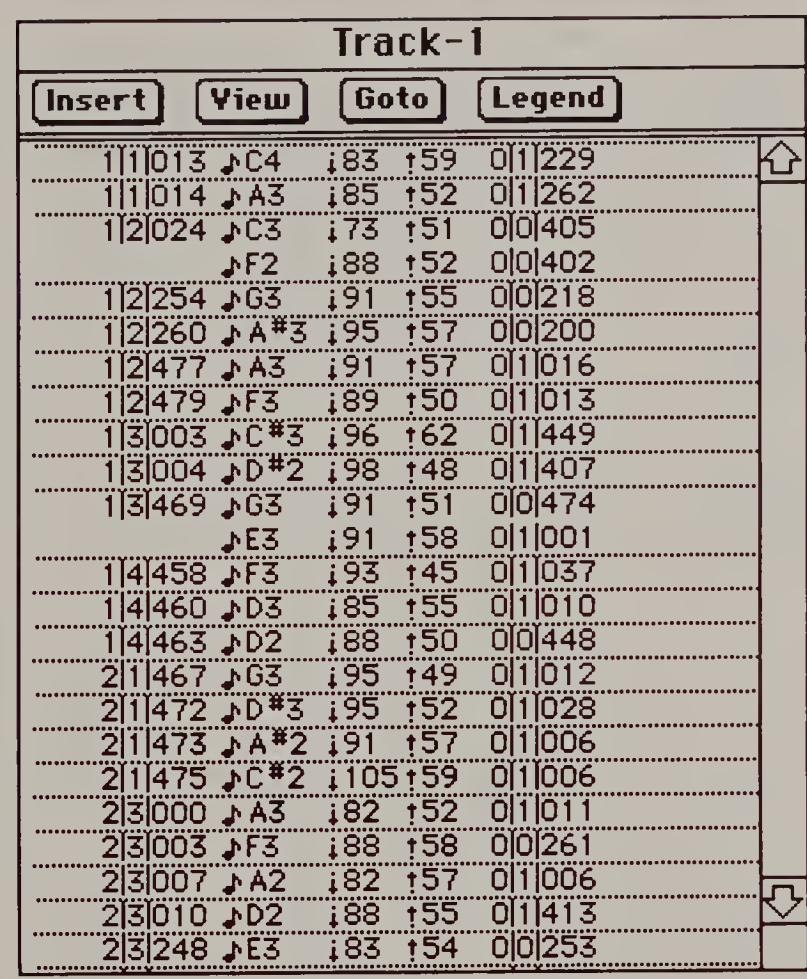


Figure 2
Two views of unquantized Performer *MIDI data, both representing the first measure of "Deck the Halls." The columns of the note-editing window's alphanumeric display represent (from left to right) measure number; beat number; tick number; type of event; pitch letter name and octave; down and up velocities of keystrike; and note duration, also expressed in measure, beat, and tick. The unquantized notation is far too accurate to be useful.*

In most cases the selection criteria not available in these packages tend to be those that have no analogies in text processing or spreadsheets. Perhaps this is because most music software is written by professional programmers who are amateur musicians rather than the other way around. While it's difficult to imagine a situation in word processing in which you might have to italicize the letters *C* or *G* in every fourth word, in music the need to add an accent to every *C* or *G* occurring on a fourth beat is well within the realm of possibility.

Software Testing

To illustrate the strengths and weaknesses of the available music processing packages and combinations, I entered an identical four-part harmonization of the first four measures of "Deck the Halls" into each of the programs. In all cases I entered the music on a MIDI keyboard. To test the programs' reactions to a variety of musical situations, I added an accompaniment that introduces several typical musical occurrences that can be problematic. These include rhythmic poly-

phony on each staff (the use of two melodies with differing rhythms), opening rests on one staff (the lower two voices start with silence), passages that require beaming in groups of both two notes per beam and four notes per beam (because of the cut-time meter signature), a tied note, and a triplet.

ConcertWare+ MIDI

ConcertWare+ MIDI's strength lies in the speed with which it turns MIDI input into conventional music notation. The program gives you a choice of three approaches to capturing MIDI data. If you know that what you have played is correct, you may insert it into your score immediately; otherwise you may "proof-hear" it and rerecord it, if necessary. To facilitate entering large compositions, you may start recording from any point in your music (like punching in on an analog tape recorder); this lets you enter a piece one phrase at a time.

Upon input, the program automatically corrects your rhythms to one of three quantization grids: an eighth note, a sixteenth note, or a sixteenth-note triplet. It also records and displays your dynamics and phrasing.

In entering "Deck the Halls" (see Figure 3), I quantized everything to eighth notes except the alto voice, which, because of the triplet in measure 4, had to be rounded off to the nearest sixteenth-note triplet. The latter quantization grid proved to be much too accurate, and *ConcertWare+ MIDI* initially included many other triplets or portions thereof in the first three measures. Since I did not want to do any hand polishing, nor did I want to do a punch-in, I ended up reentering the alto part about a half-dozen times until it was correct.

A nice transcription feature is that *ConcertWare+ MIDI* lets you specify a key-velocity threshold to compensate for sloppy performance. Once you set the threshold, the program ignores any notes struck below that volume. Although other programs permit the user to filter out notes below a certain dynamic level, *ConcertWare+ MIDI* is the only one that includes this feature as an input-filtering option.

ConcertWare+ MIDI has a number of failings, however. Its music font is, in a word, ugly. Compounding matters is the absence of many essential symbols, including the key signatures for C-sharp and C-flat.

The program's limitation to eight monophonic parts is tolerable only in special applications. When the program displays all eight parts on a single grand staff, it makes no attempt to rectify note collisions other than to move the lower note out of the way when the notes' rhythmic values differ. This usually results in incorrect notation. The resulting mishmash of overlapping symbols is difficult to read. The developers must have realized the confusion this would cause, since they provided a set of diamond- and cross-shaped note heads to help users follow the paths of their melodies.

ConcertWare+ MIDI's strength lies in the speed with which it forms MIDI data into notation.

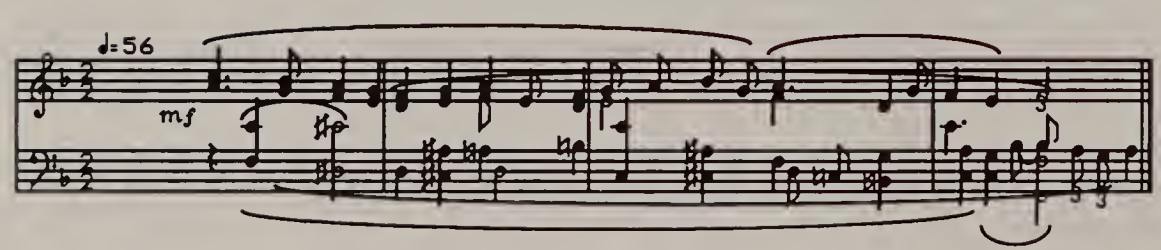


Figure 3

ConcertWare+ MIDI *produced this LaserWriter output by quantizing on input. While this was the fastest and simplest conversion of MIDI data to notation, alignment problems exist in every measure. The program avoids some symbol collisions by simply moving notes out of the way, thus destroying any consistency of vertical alignment and making the passage practically impossible to read. Measure 4 contains nonstandard triplet notation, and there are note stem direction errors in every measure.*

Deluxe Music Construction Set

Deluxe Music Construction Set has a number of firsts to its credit. It's the first program to take advantage of the Sonata PostScript music font and to allow slanted beams. It's also the first program to permit rhythmic polyphony on a single staff and to treat all symbols as graphics that can be dragged by the mouse.

Geoff Brown, the author of *DMCS,* believes that a music editor must be fundamentally a graphics editor, with the musical semantics handled automatically by the software. The built-in rules make their best guess, but you can always edit their solution by selecting a symbol and dragging it to change location, angle, or size. If you want, you can even hear the pitches change as you drag a note up or down the staff. But perhaps even more remarkable, you can drag notes to temporal locations preceding or following adjacent notes.

Another useful editing feature lets you move notes in real time while a specified passage repeats. This is great for testing a number of variations or fine-tuning a musical idea. Dynamics, including crescendos and decrescendos, translate into appropriate MIDI velocity changes on output. *DMCS* is unique in that it lets the user specify exactly which velocity values correspond to which dynamic symbols.

Music Processing Scoreboard

	Integrated Packages			Optimized Combinations			
	MusicWorks[1]	**ConcertWare + MIDI**	**Deluxe Music Construction Set**	**DMCS with MegaTrack**	**DMCS with MIDIMAC**	**Professional Composer with MIDIMAC**	**Professional Composer with Performer**
Features							
Entry Methods[2]	R, M	R, M	T, M	R, T, M	R, S, T, M	R, S, M	R, S, M
Number of Parts/ Mono- or Polyphonic	4/mono	8/mono	16/poly	16/poly	16/poly	16/poly	40/poly
Rhythmic Polyphony	Quasi 4-part	Quasi 8-part	2-part	2-part	2-part	2-part	Merged[3]
Multichannel Record	No	No	No	Yes	Yes	Yes	No
Quantization Type[4]	I	I	n/a	B, F	O, F, A	O, F, A	B, F
Quantization Grid Range	16th	Triplet 16th	n/a	Triplet 32nd	Triplet 32nd	Triplet 64th	Any
Tuplet Capabilities	None	Triplet only	Triplet, quint	Triplet only	Triplet only	(Manual)	(Manual)
Editing Scope[5]	S, C, P, M, R	S, C, P	S, C, P, M, R, D	S, C, P, M, R, D	S, C, P, M, R, N, D	S, C, P, M, R, N	S, C, P, M, R, N
Postinput Part Separation[6]	No	No	No	C	M/C	M/C	M
Loses/Adds Information on Notes during MIDI Conversion	n/a	n/a	n/a	Loses	Loses	Loses	Adds
Formatting	Rule-based	Rule-based	Graphics	Graphics	Graphics	Rule-based	Rule-based
Total Number of Staves/ Number Visible	2/2	2/2	8/8	8/8	8/8	16/8	40/8
Variable Staff Spacing	No	No	Yes	Yes	Yes	Yes	Yes
Symbol Complement	Minimum	Minimum	Average	Average	Average	Superior	Superior
Beaming/Diagonal Beaming	None/No	Manual/No	Manual/Yes	Automatic/Yes	Automatic/Yes	Automatic/No	Automatic/No
Printing[7]	I	I, L	I, L, A	I, L, A	I, L, A	I, L	I, L
Automatic Part Extraction	No	No	Rudimentary	Rudimentary	Rudimentary	Yes	Yes
Utilities							
Metronome: Visual/Audio/ Beats per Minute	A/50-300	A/30-450	A/1-240	A/30-300	A/1-500	A/1-500	A, V/40-400
Set Meter/Key Signature	Yes/Yes	Yes/Partial	Yes/Partial	(DMCS)	(DMCS)	Yes/Yes	Yes/Yes
Change Meter/Time Signature	No	No	Yes	(DMCS)	(DMCS)	(Pro Comp)	(Pro Comp)
Automatic Rhythm Checking	Rudimentary	No	Rudimentary	(DMCS)	(DMCS)	Yes	Yes
Automatic Range Checking	No	No	No	No	No	Yes	Yes
Automatic Instrument Transposing	No	No	No	No	No	Yes	Yes
Measure/Beat Counter	M	M	M	B (MegaTrack)	B, M (MIDIMAC)	B, M (MIDIMAC)	B, M (Performer)
Metric/Dynamic Intelligence	No	No	No	No	No	No	Yes

[1] Prerelease version.
[2] Real-time, step-time, timed-step, mouse.
[3] Multiple staves may be merged into one staff with *Professional Composer* but must be unmerged to edit.
[4] Input, output, buffer, file, automatic on conversion (upper limit of grid range is dotted whole note in all cases).
[5] Single note, consecutive group, part, multiple parts, region of multiple parts, nonconsecutive, during loop play.
[6] Postinput separation of parts played simultaneously is based on music criteria or channel information.
[7] ImageWriter, LaserWriter, Adobe PostScript music font.

Music Processing Scoreboard
A feature comparison for Macintosh music processing packages and sequencer-notation software combinations. Because MusicWorks *remains the most popular Macintosh music program, this table includes specifications for a prerelease version of* MusicWorks MIDI. *The final program may differ from the one described here.*

DMCS has no provision for real-time input, but it does have a unique approach to step-time input from a MIDI keyboard. You specify an input timing value somewhere between ¼ second and 5 seconds. Next, select a rhythmic value from the symbols palette. When you play notes at your MIDI keyboard and hold the notes for a shorter period than the value you specified, the notes appear on the screen with the preselected rhythmic value. Hold the key down for longer than the current timing value, and the rhythmic value cycles through every possible duration above the selected one. In this way you can enter notes with widely varying rhythmic values without having to reach over to the Macintosh to change the default value. I created the score in Figure 1 with *DMCS*'s unique MIDI step-time input.

At least two MIDI sequencer packages have been optimized to export data to *DMCS:* Musicworks' *Mega-Track XL* and Opcode Systems' *MIDIMAC Sequencer.* In turn, *DMCS* can save files in *MIDIMAC Sequencer* format.

MIDIMAC with DMCS and Professional Composer

Opcode's *MIDIMAC Sequencer* is a powerful MIDI sequencer with no built-in notation features. Instead, it has options that let you produce MIDI, *DMCS,* or *Professional Composer* files. *MIDIMAC Sequencer* works in *Switcher* or *Servant* with either *DMCS* or *Professional Composer* (or with both at once on a Mac Plus), so moving back and forth between MIDI data and notation is relatively easy.

The passage illustrated in Figure 4 initially opened up as a four-stave *DMCS* document. I collapsed those four staves into two to match the other examples. With the exception of widening the space between the staves slightly, I did no manual finishing. Beaming was completely automatic, and the triplet was in place. Out of 12 possible enharmonic note-name conversion errors, only one fumble was made—the E-flat notated as a D-sharp in the first measure. Finally, the closing double bar was present.

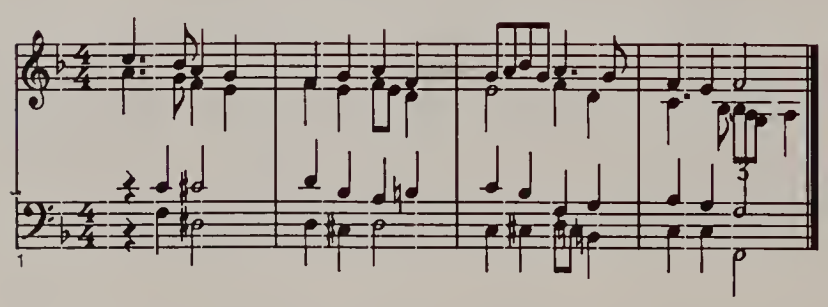


Figure 4
This DMCS *document was entered in real time using* MIDIMAC Sequencer. *The output is similar to that in Figure 1, except that the beams, which were added automatically, are all horizontal, and the E-flat in the first measure appears as a D-sharp (for diagonal beaming, mouse editing in DMCS would be required). This software combination is the only one that handled the triplet in measure 4 correctly when converting from real-time MIDI data.*

Composer Steve Reich's works have been performed by major ensembles and orchestras around the world—including the New York Philharmonic and the Chicago Symphony—and choreographed by the likes of Jerome Robbins for the New City Ballet. He is currently using Professional Composer *to produce the score and parts for a piece commissioned by the San Francisco Symphony. Reich, who once paid $8000 to have the parts for a 15-minute piece for the St. Louis Symphony copied out, calls notation programs "a tremendous liberation for composers from the economic strain of producing music."*

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MIDIMAC's option to save files in *Professional Composer* format enables this sequencer to go beyond *DMCS*'s eight-stave limitation. When a *MIDIMAC* file is exported to *Professional Composer,* you must specify a key signature for the output file. As Figure 5 illustrates, accidentals are not handled as well as after export to *DMCS.* Comparing the *MIDIMAC-Composer* version to the version generated by Mark of the Unicorn's own *Performer* sequencer (see Figure 6) reveals, somewhat surprisingly, that *MIDIMAC* handled the fourth-measure triplet much better than did *Performer.*

It should be noted that pieces converted in the opposite direction—from *Professional Composer* to *MIDIMAC Sequencer*—do not carry their dynamics, accents, and articulations with them, as they do when going from *Professional Composer* to *Performer.* The same is true when you convert documents from *DMCS*

to *MIDIMAC Sequencer*. If you are going to control a synthesizer with the notation, this is an important consideration.

Performer and Professional Composer

Mark of the Unicorn's *Performer* MIDI sequencer running under *Switcher* or *Servant* with the same company's *Professional Composer* is the most powerful music processing configuration that has ever been available on a personal computer.

Performer represents information as a MIDI data stream, as seen in Figure 2. This format takes some getting used to, but once you get the hang of it, it's quite efficient, since each line of the Track Editing window contains so much information. *Performer* adheres strictly to the Macintosh user interface, and its multiple windows let you view any number of tracks simultaneously. The program's internal rhythmic resolution of 480 *ticks* to a quarter note allows quantization to almost any groupet that can be expressed by two 2-digit numbers.

Performer's wide range of editing operations should accommodate even the most demanding user, since, for the most part, identical edit operations may be performed on independent parameters. And in the area of editing scope, *Performer* is the undisputed leader. Regions may be quickly defined as consisting (vertically) of any number or grouping of tracks and (horizontally) of any portion thereof that can be specified in measures, beats, and ticks. The power of this type of selection is augmented by provisions for selecting nonconsecutive notes based on considerations of pitch ("only notes between C4 and D#5"), vertical placement ("the top two notes of each chord"), loudness ("all notes with velocities of between 62 and 89"), and duration ("all notes with durations between a dotted eighth note and a half note tied to a triplet"). Finally, you may combine many of these selection criteria with a Boolean AND to further zero in on the desired values.

Performer has by far the most flexible quantization options of any sequencer. Beaming is automatic, but as with all other sequencer/notation combinations, dynamic information is lost in the translation to *Composer*. Also lost are any tuplet quantizations, which can be a serious problem because *Composer* attempts to round off the offending groupet to nontuplet values—usually expressing the passage in 128th notes (see Figure 6).

Performer with *Composer* is the only combination that lets you enter an entire piece at once rather than inputting the music one part (for example, melodic line or baseline) at a time. The option to cut notes off a track based on voice placement eliminates mistakes that might result from voice crossings if the various voices were extracted on the basis of pitch range. After playing the passage in Figure 6 into *Performer* and quantizing it, I expanded the resulting

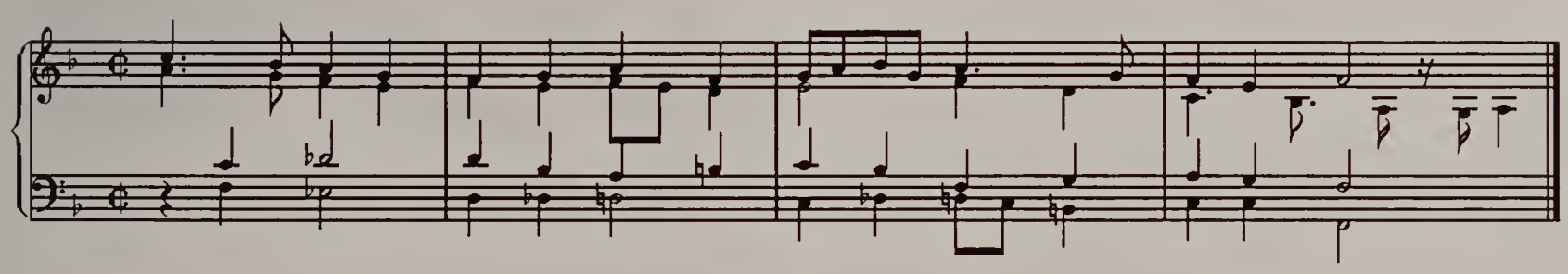

Figure 5

The same MIDIMAC *sequence from Figure 4 converted to a* Professional Composer *document and printed on a LaserWriter using Mark of the Unicorn's own bit-mapped font. Beaming was automatic, and alignment is excellent. The E-flat in the first measure is correct, but the C-sharps in measures 2 and 3 are incorrectly notated as D-flats. Notice that the final triplet—while still incorrect—has been handled much more elegantly than in the conversion to* Professional Composer *from Mark of the Unicorn's own* Performer.

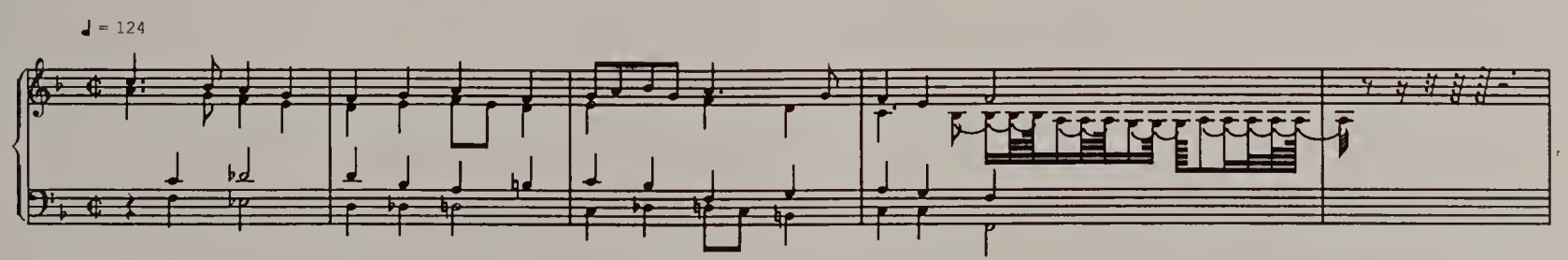

Figure 6

Performer *data converted to* Composer *notation does not include tuplets of any kind. Instead, the notation program rounds tuplets off to nontuplet note values. In this example, a simple eighth-note triplet has been rounded off to tied 128th notes. To compound the illegibility, the round-off remainder has been tied into the next measure, adding a nonexistent fifth measure.*

track into four tracks by cutting the top voice off track 1 and pasting it onto track 2. I then repeated the process for tracks 3 and 4, finally rearranging the tracks so that upon conversion, the *Composer* staves read from low to high starting with the bottom staff. I switched to *Composer* and opened the newly created file. Because there were four tracks in the *Performer* document, there were four tracks in the *Composer* version. I simply merged the top and bottom two tracks each into single staves to produce the final output.

For even the simplest orchestral works, *Professional Composer* is currently the only option. The number of available professional symbols is vast, and the maximum number of staves—40—far exceeds anything offered by other programs. Because *Composer*'s main document window size is tied to screen width, it

For even the simplest orchestral works, Professional Composer is currently the only option.

lets you view almost two dozen staves when used with a large-screen monitor such as the MegaScreen (from IDT Systems), the E-Machine, or the Radius.

Mark of the Unicorn's approach is rule-based, as opposed to the graphic editing approach of *DMCS*. Automated features include instrumental transposition, instrumental range checking, rhythmic proofreading, and part extraction. Note placement is almost completely subject to built-in rules, and once a symbol has been placed on the screen, it can be moved only with considerable difficulty. This and the restriction to horizontal beaming are the main failings of this professional notation program.

Composer offers an extremely innovative approach to the problem of including text (lyrics) with music. Tabbing between words or syllables attaches them to specific notes in a melodic line. These notes then drag the attached text with them when reformatting of accompaniment passages results in overall spacing changes.

When a file is moved from *Composer* to *Performer* to control a synthesizer, some amazing processing is applied to the velocities and durations of notes. First, the velocities all change to reflect the accent pattern of the prevailing meter. Six MIDI velocity points are added to downbeats, and all other metrical

Composer and keyboardist Herbie Hancock has always been in the vanguard of technological innovation in music. Hancock uses a Mac for music processing as well as a variety of other applications, such as editing sounds, storing sound "patches," and controlling synthesizers. Of the programs mentioned in this article, he works with Total Music, MIDIMAC Sequencer, Professional Composer, *and* Performer.

RICHARD PASLEY

stresses are ordered hierarchically within this framework. Everything is then scaled to the prevailing dynamic level. In addition, expressive markings such as staccato dots and slurs that have been added in *Composer* are interpreted as an alteration of the notes' durations. Similar "intelligence" is applied to the interpretation of accents.

A few inconsistencies currently mar the *Professional Composer/Performer* combination. You can change meter as often as you want while in *Composer*, and *Performer* interprets the changes accurately. Unfortunately, you cannot indicate a time signature change from within *Performer*, so to change signatures you must endure a good deal of tedious rebarring. Crescendos and other dynamics are also lost upon conversion from *Performer* to *Composer*. In addition, any text added in *Professional Composer* is discarded when the file is reconverted to *Performer*. *Composer*'s inability to correctly notate tuplets, even triplets, that have been perfectly quantized in *Performer* is a serious limitation.

Professional Composer cannot use the Sonata music font at this time, although Mark of the Unicorn hopes to have a version that is compatible with the font sometime in 1987. The company's own music font looks acceptable when output on a LaserWriter. Ironically, if you want to use the laser music font to print a score you have worked on with *Professional Composer,* you must first open the *Composer* file with *MIDIMAC Sequencer* and then save it again as a *Deluxe Music Construction Set* document.

Composer offers an innovative approach to the problem of including lyrics with music.

Postprocessing with High Score

High Score is a music postprocessor developed by Advanced Music Notation Systems. The program was unavailable for review when this article was written but has probably been released by now. While the application itself has few editing features, it provides extensive control over document formatting for the Apple LaserWriter or other PostScript-compatible printers. *High Score* contains very powerful automatic features—it knows a lot about music notation—and it allows extensive interactive editing for those inevitable situations where it doesn't know enough. In theory, *High Score* performs the same function in music processing as *PageMaker* does in word processing.

High Score is the first system designed to address the needs of both the composer and the music publisher. In doing so, it will likely be instrumental in developing the desktop music-publishing industry made possible by the current state of music processing. Figure 7 was output on a 1270-dpi Linotronics 100 using *High Score.*

The Future

The effects on the music industry of the switch to computerized music processing will be far-reaching. In the not-too-distant future, for example, mass storage of scores and publication on demand have the potential to help disseminate the works of living composers. Hand-copying the score and parts of Leonard Bernstein's latest opera, *A Quiet Place,* cost well over $100,000. Such costs could be cut dramatically if composers regularly wrote their scores on disk. Another idea that's well within the realm of possibility is music education systems that sense a student's playing, provide feedback, and adapt course materials to the student's rate of progress.

In the shorter term, one new idea that will soon be a reality is a musical database. Bogas Software's *Studio Session* already has some database-like features. This program lets you identify phrases as objects, store them in a library, and search for them on the basis of length, meter, or user-definable categories. When you have retrieved phrases in this manner, you can manipulate them as single entities, experimenting with different juxtapositions of musical material. (By the time you read this, a MIDI version of *Studio Session* will probably have been released.)

In such a rapidly changing field, it's hard to predict what other developments the future may bring. What is certain is that whatever you're doing with music processing at this moment, it would have been science fiction just one year ago. □

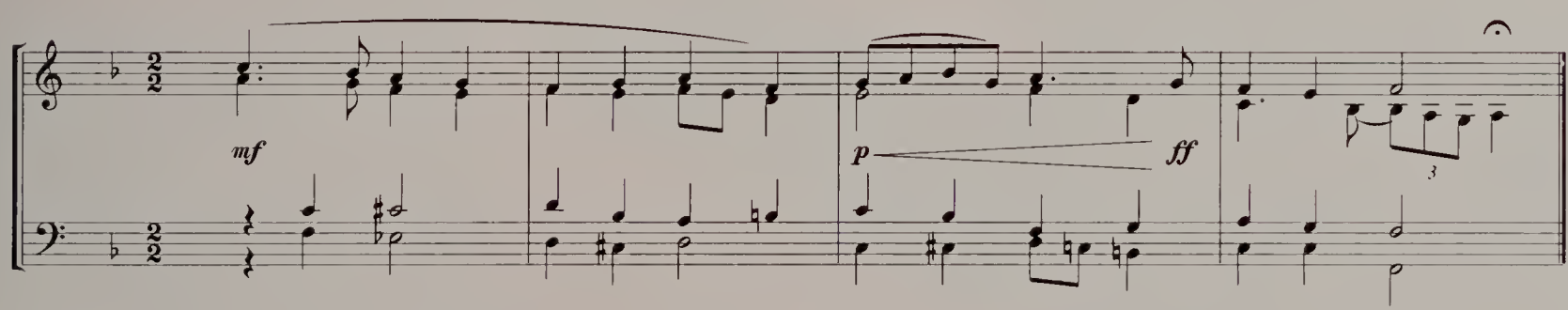

Figure 7

This High Score *document was printed with a 1270-dots-per-inch Linotronics 100 laser typesetter. Notice the elegant avoidance of symbol collisions and the absence of "jaggies" in the diagonal beams and slurs.*

The Game Hall of Fame

We're not playing around. These are the best Macintosh games.

by Steven Levy

They warned me, all right. "You'd be a fool," they said, "to try to play enough Macintosh games to pick the best."

But someone had to do it. So I did, played every game I could lay hold of, hour after hour, day after day. And then my mind went. Like some invisible Walkman, a mocking, but not wholly unreasonable, voice kept asking me questions. I would have

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gone mad had I not realized that it was my conscience speaking. The ensuing internal dialogue kept me honest and explained worlds to my editors, so I present it here, in sanitized form, to explain the successful completion of my mission.

Are these really the best games the Macintosh community has come up with?

Yes.

Who are you *to say?*

Someone who has let his private and professional life languish for the past month while getting addicted (in some cases readdicted) to the great–and not-so-great–Macintosh games.

You mean to say you've played all the games available on the Macintosh?

Of course not. There are more Macintosh games than anyone can shake a mouse at.

So how do you know you've picked the best?

Give me a break, already. Sometimes you have to take a leap of faith. I don't deny a measure of subjectivity. Even personal bias. If history proves me wrong, tough. I think history has better things to do with its time than play Macintosh games. Except maybe *Wizardry.*

Could you at least tell us some of the criteria you used?

I concluded, not surprisingly, that the best games are the ones that play to the Mac's strengths–graphics, friendly interface, easy control of the environment, and an assumption that the user is both reasonably intelligent and grateful for a creative outlet. Games that expose the Mac's gaming weaknesses–sluggishness, or the fact that in many cases the mouse is no match for a joystick–naturally came up short.

Beyond that, I looked for a challenge and the magic that provides a reason for coming back again and again. The magic comes largely from a game's ability to create a compelling world for you to step into and, in some cases, control.

Since games fall easily into categories, I picked the best and a runner-up or two in each division.

If you were to do this six months from now, would the list be different?

Undoubtedly.

Best Arcade Game:

Airborne! Funny how even the simplest games can divert us for hours. *Airborne!* is a case in point. Borrowing brazenly from personal computer predecessors (namely, *Sabotage* for the Apple II and, even before that, *Target* for a 1976 machine called the Sol), *Airborne!* follows the tried-and-true paranoid arcade plot: fend off the bad guys before your inevitable engulfment. In this case, you hole up in a bunker while planes drop parachutists, and eventually tanks, to destroy you. The mouse aims your mortar shells accurately and intuitively.

Runner-up: Megaroids. A well-crafted Macintosh version of the old *Asteroids.* Available on line (including from CompuServe) and from user groups.

Best Role-Playing Game:

Wizardry This famous computer translation of the Dungeons and Dragons zeitgeist, years in the making, proves emphatically that late is better than never. The pre-Macintosh incarnation of *Wizardry,* while bewitching, was forever bogged down in housekeeping. But Mac *Wizardry* takes full advantage of windowing and mousing and is a dream to play.

The plot is simple: create a party of six warriors that descend into a dungeon to retrieve an amulet from an evil wizard. Along the way, kill lots of monsters. (Villains come in amazing varieties, from Vorpal Bunnies to Medusalizards.) The game's complexity comes in developing your warriors; your characters develop distinct personalities, and you can get quite attached to them. Believe me, when one of your sixth-level Samurais gets wiped out by a Foaming Mold on the fourth maze, you'll feel as if your dog has died.

You need a lot of time to play this game. To expedite matters, I "cheat" a bit and use ready-made maps. *The Book of Adventure Games* includes this contraband.

Runner-up: Xyphus. This game is not as intricate as *Wizardry,* but it has a set of miniscenarios, which means you can actually win a game before you turn 50.

Best Adventure Game:

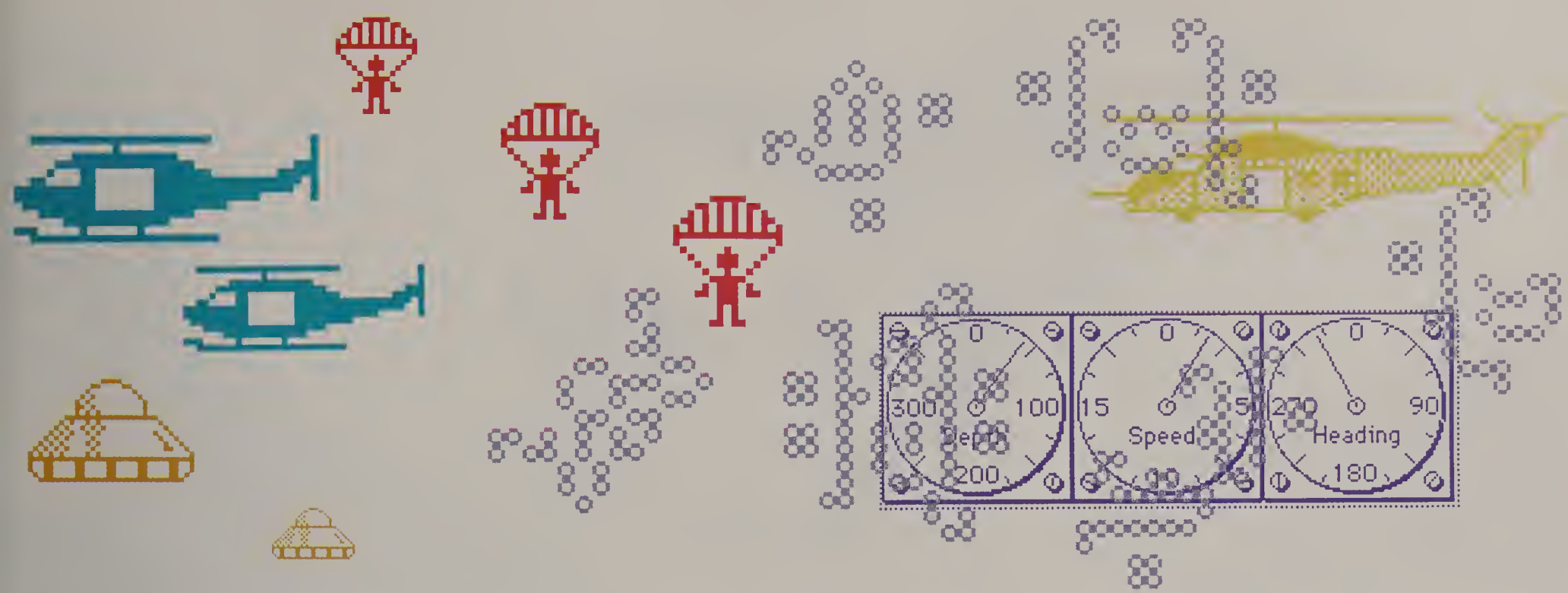
Déjà Vu Let me first confess that I'm a bit jaded by the adventure format. All too often, the puzzle-solving aspect of the game overwhelms the literary possibilities. *Déjà Vu* avoids that shortcoming. Aside from its debt to the *film noir* tradition, it discards verbal pretensions and lets you mouse-and-window your way to a solution to a hard-boiled murder tale. (I'm only assuming there is a solution, because I haven't found it yet.)

By eliminating typed responses in favor of points and clicks, *Déjà Vu* plays into the hands of those who charge that computer games will lead us into the postliterate era. Still, I prefer it to other games in which the adventure lies in guessing which vocabulary words the game understands.

Runner-up: Any Infocom game. They're uniformly well done. Lately, I've been toying with the *Leather Goddesses of Phobos,* which is not only challenging but mildly bawdy.

Best Sports Game:

MacGolf There are plenty of good Mac sports games, but too often slow response time or clumsy mouse play handicaps the better efforts. *MacGolf* sidesteps this problem by eliminating the hand-eye-reflex stuff, concentrating instead on strategy.



I don't play golf and have little tolerance for duffers' complaints about hooks and slices. But *MacGolf* makes these considerations vivid by presenting golf from a wonderful graphic point of view. You always stand directly behind your golfing surrogate. After choosing his club, stance, ball placement, and angle of shot, you clearly see the results of the swing. The game isn't perfect—it takes too long to redraw the screen, and although trees may block your view, they don't stop your golf ball. But in pace and strategy, it feels like a day at the links.

Runners-up: Grand Slam Tennis, Championship Boxing. The first mixes tennis strategy (intriguing) with mouse movements (difficult). The second is an exciting but tough-to-control boxing game that lets you pit famous fighters against each other.

Best Strategy Game:

The Ancient Art of War While most war games assume users already have a Napoleon complex, *The Ancient Art of War* takes a deep breath and introduces military strategy as a Zen art. Something like full-contact flower arranging. Though the lessons are from philosopher Sun Tzu (c. 400 B.C.) and the sumptuous packaging has a Ming dynasty flair, the choice of campaigns ranges from Sherwood Forest to Custer's Last Stand. You also have a choice of eight opponents, including Genghis Khan and Napoleon.

All the aphorisms of Sun Tzu—the secrets of crafty warring—come into play during the campaigns. Clearly delineated graphics make complex troop movements comprehensible (though winning is seldom easy). But the best part comes when your fighters clash with the opponents. The screen zooms out; you see your squad, in the formation you've chosen for them, facing the enemy—and as if in a tiny movie, they clash. If things look bad, try retreating, risking perhaps a few arrows in the back.

Advanced warriors with creative streaks can use *Art of War*'s Game Generator to construct their own campaigns, building battlegrounds and making armies. There's enough to keep you busy here for a Hundred Years War.

Runner-up: Balance of Power. This is my knee-jerk liberal choice. In failing to prevent a nuclear war, you learn a valuable lesson. I just wish it were a little less boring.

Best Brain Game:

Life Professor John Horton Conway developed this fascinating exercise during teatime at Cambridge University, trying to prove something about mathematical forms duplicating themselves (as people do). Whimsically, he called it *Life*. The game—which is actually a simple set of rules that determine whether squares, or cells, on a grid are "on" or "off" during the next round—acquired a cult following among scientists, game freaks, and hackers. The Macintosh has made it accessible to everyone.

While its implications are abstract and can take you as far as the borderline between science and religion, the play itself is elementary: pick a *Life* form and set it running. At the very least, you get interesting patterns. Often, from what seems a seething chaos of blinking dots, little creatures emerge, boogying their way across the screen and causing stable life forms to erupt in confusion. For more information on the game, see *The Recursive Universe,* by William Poundstone.

LAZ Life (version 2.0c) is the nicest version available. It offers a choice of speeds and cell sizes, as well as easy construction of life forms. One menu choice instantly provides any of 16 "classic" forms, and by using the Scrapbook, you can store more forms and swap with other enthusiasts. Get the game free on bulletin boards; the author asks only a voluntary donation.

Runner-up: Sargon III. A devastating chess partner.

Best Simulation:

Flight Simulator Licensed pilots I know have a very easy time running the Microsoft *Flight Simulator*. I crash a lot on it. (The program doesn't crash; my plane does.) This is as it should be. As time passes, I'm getting better at not crashing; this means that I'm not only learning the program, I'm learning to fly. Look Ma, no Dramamine!

Flight Simulator's verisimilitude is stunning. From the true-to-life sound of the Cessna, to the representations of dozens of actual airports, to the intricate controls, it's the ultimate in personal computing simulations. And Macintosh chauvinists can flaunt it at other computer owners: the Mac version is by far the best *Flight Simulator* that Microsoft offers.

Distant runner-up: Gato. Find out what you missed by not being a submarine commander in the Pacific Theatre during World War II. □

Tools for the Trade

The program development system developers have been longing for—a preview of the Macintosh Programmer's Workshop

by Fred A. Huxham and Kurt J. Schmucker

When Apple introduced the Macintosh, the only way to develop software for it was with a Lisa and the Lisa Pascal Workshop. The lack of a native Mac development system may have been one of the reasons why software was initially so scarce. A year later Apple released the Macintosh 68000 Development System (MDS), a 68000 assembler. While this package gave developers the ability to develop software on the Mac, MDS lacked the power of the Lisa Workshop and the friendliness of a high-level language like Pascal.

Meanwhile, third-party vendors released program-development systems for nearly all the major computer languages: assembly language, C, Pascal, FORTRAN, FORTH, LISP, Prolog, Smalltalk, COBOL, APL, and others. These systems, however, did not generally allow application developers to combine program modules written in different languages into a single program.

Now, nearly three years after the Mac's introduction, the Macintosh Programmer's Workshop (MPW) promises to be the powerful multilanguage development system for which developers have been waiting.

Tools for Thought

The Macintosh Programmer's Workshop is an integrated programming environment that consists of the MPW shell, an M68000-family assembler, a linker, a make facility, a debugger, a resource editor, a resource compiler and decompiler, and various programming utilities. In addition to the basic MPW system, you can purchase Macintosh Workshop C; Macintosh MPW Pascal; and the MacApp object, or "class," library. For this preview we looked at a beta version of the new package, which is scheduled for final release in January.

The assembler, the compilers, and the linker are all *tools*—applications that run under the control of the shell. Tools can take input from or send output to files, shell windows, or other tools. "MPW Tools" lists a few of the tools provided with MPW. In addition, the package lets you create your own specialized tools.

MPW runs on the Macintosh XL, the Mac 512K, the Mac 512K Enhanced, and the Mac Plus. It requires a minimum of two 800K drives, but a hard disk would be better. Running MPW on a floppy drive system limits you to using only one language at a time. If you are developing in C or using MacApp, you need at least a 1-megabyte machine. The full MPW system, including the assembler, the C and Pascal compilers, and MacApp, requires over 4 megabytes of disk space.

Programming in a Shell

The core of MPW, the shell, integrates file creation, editing, and manipulation. The programming tools, as well as the assembler, the compilers, and the linker, all execute under the shell's control.

As an editor, the MPW shell outperforms all others. It provides all the standard features found in a typical Macintosh editor, plus a command language, shell variables, command aliases, regular expressions, selection operators, pipes, and the ability to redirect input and output.

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MPW Tools

The following is a list of the more powerful tools included with the MPW system.

Make A program builder. Make uses a Makefile, created by the programmer, which describes the dependencies between the components of an application. Each line of the Makefile says something like "File X depends on file Y, and if file Y's modification date is later than X's, perform Z to bring X up-to-date." Make operates in two stages: it reads the Makefile and checks all dependencies, then it outputs all of the shell commands that need to be performed to bring an application up-to-date.

Link This tool links object files together into an application, a desk accessory, or a driver.

Lib Combines assembly, C, and Pascal object files to create libraries. In addition, it enables you to rename or delete modules and change the names of segments.

MDSCvt Converts a Macintosh 68000 Development System assembler source file to the MPW assembler syntax.

TLACvt Converts a Lisa TLA assembler source file to the syntax required by the MPW assembler.

Rez A resource compiler. Rez compiles a resource description file and produces a standard Mac resource file. Rez is one of the reasons MPW is so powerful. The program uses a C-like syntax that makes it as easy to define a new resource type as it is to define a C structure or a Pascal record.

DeRez Decompiles resource files and creates resource description files. DeRez converts existing resources into a form that Rez can read.

The command language provides editing, structured control, and file manipulation commands. A list of the shell commands appears in "Shell Commands."

Following the Script

You can use the shell commands interactively or combine them in a shell script file. MPW comes with the special script files StartUp, Suspend, Resume, and Quit, which enable you to tailor the environment to your work habits.

Whenever you launch the shell, the StartUp file (which is similar to a .login file on a UNIX system) is executed. StartUp defines the path names and default settings, called *shell variables,* that are used by the shell and the tools. For example, the shell references the variable {Commands} (MPW variables are enclosed in braces), which is a list of directories the shell searches when looking for a tool or an application to execute. The editor references the variable {Tab}, which defines the default tab setting for files, and the variable {PrintOptions}, which specifies what print options will be used for the Print menu commands. In addition, the assembler and the compilers reference shell variables to determine the path names to library files and include files.

When you launch an application from the shell, the Suspend file saves the shell's configuration of windows along with the variable definitions and any aliases, or alternate names, you may have assigned to commands. Then when you quit from the application and return to the shell, the Resume file is executed, restoring the windows, variable definitions, and aliases to their original state. The Quit file is executed when you leave the shell. A typical Quit file, for example, might save all open files along with the current configuration of the shell.

The shell commands work with regular expressions, which define text patterns. Regular expressions make it easy to specify very complex text patterns. For example, suppose, somewhat improbably, that you were trying to find a word at the beginning of a line that began with the string "foo," followed by a 4, a 5, or a 9, followed by the string "bar," followed by a single character, followed by the string "blat," followed by zero or more characters, and ending with any character except 0, 2, or Z. If you also wanted to replace this word with the string "Macworld," you could execute the following code:

```
replace /•foo[459]bar?blat≈[¬02Z]/d 'Macworld'
```

Adding to the Menu

The MPW shell lets you define commands in custom menus easily. For instance, the code in Listing 1 adds three new items to the shell's Find menu: First

Line, All Lines, and Funky Word. When selected, these options find and select, respectively, the first line, all lines, or all lines between occurrences of the funky word.

A shell feature that will be familiar to UNIX and IBM PC programmers is pipes. Pipes allow you to take the output from one command or tool and send it directly to another. For example, you could count the number of files in the current directory by piping the output from the Files command, which lists the files in the current directory, to the Count tool, which counts the number of lines in a file.

Input and output redirection is another powerful shell feature. Redirection lets you place the output of a command in a file. For example, the following command places the number of files in the current directory in a file named NumOfFiles:

```
Files | Count -1 > NumOfFiles
```

The > symbol indicates that the output from the left side of the expression is to replace the contents of the file on the right. The >> symbol appends data to a file instead of replacing the contents of the file. And the < symbol sends data from the right side of the expression as input to the left side of the expression.

MPW Pascal

With the introduction of MPW Pascal, Apple brings to market the first object-oriented Pascal compiler. (See "Object Orientation," *Macworld,* November 1986, for an introduction to object-oriented programming.) MPW Pascal implements all the features in the "Object Pascal Report" developed by Larry Tesler of Apple's object-oriented development team in conjunction with Niklaus Wirth, Pascal's founding father.

MPW Pascal includes the Pascal compiler, a utility that formats Pascal source code, and another utility that builds cross-referenced listings of variable names in Pascal programs. The program also comes with a variety of Pascal libraries, including ones for three-dimensional graphics and for the Standard Apple Numeric Environment (SANE). You can use MPW Pascal with MPW's linker and resource compiler to create

Shell Commands

Editing Commands

Adjust	Adjusts lines
Align	Aligns text to left margin
Clear	Clears selections
Close	Closes window
Copy	Copies a selection
Cut	Cuts a selection
Find	Finds and selects a text pattern
Font	Sets font characteristics
New	Opens a new window
Open	Opens a file for editing
Paste	Pastes a selection
Replace	Replaces a selection
Save	Saves a window
Tab	Sets tab positions
Target	Makes a window the target window

Structured Control Commands

If	Causes commands to execute conditionally
For	Repeats command list once per parameter
Loop	Repeats command list until Break
Break	Breaks from For or Loop
Continue	Continues with next iteration of For or Loop
Exit	Exits from command file

File Manipulation and Other Commands

AddMenu	Adds menu items
Alert	Displays an alert box
Alias	Defines alternate command names
Beep	Generates tones
Catenate	Concatenates files
Confirm	Displays confirmation dialog box
Date	Writes the date and time
Delete	Deletes files and directories
DeleteMenu	Deletes menu items
Directory	Sets the default directory
Duplicate	Duplicates files and directories
Echo	Echoes parameters
Eject	Ejects disk
Equal	Compares files
Erase	Initializes volumes
Export	Exports shell variable
Files	Lists files and directories
Help	Writes help file
Mount	Mounts volumes
Move	Moves files and directories
NewFolder	Creates new folders (directories)
Parameters	Writes parameters
Rename	Renames files and directories
Request	Requests text from a dialog box
Set	Defines shell variable
SetFile	Sets file attributes
Shift	Renumbers shell positional parameters
Unalias	Removes aliases
Unmount	Unmounts volumes
Unset	Removes shell variable
Volumes	Lists mounted volumes
Windows	Lists windows

```
AddMenu        'Find'        'First Line' 'find 1 "{Active}"'
AddMenu        'Find'        'All Lines' 'find 1 •:∞"{Active}"'
AddMenu        'Find'        'Funky Word' ∂
 'find /•foo[459]bar?blat≈[¬02Z]/:/•foo[459]bar?blat≈[¬02Z]/ "{Active}"'
```

Listing 1

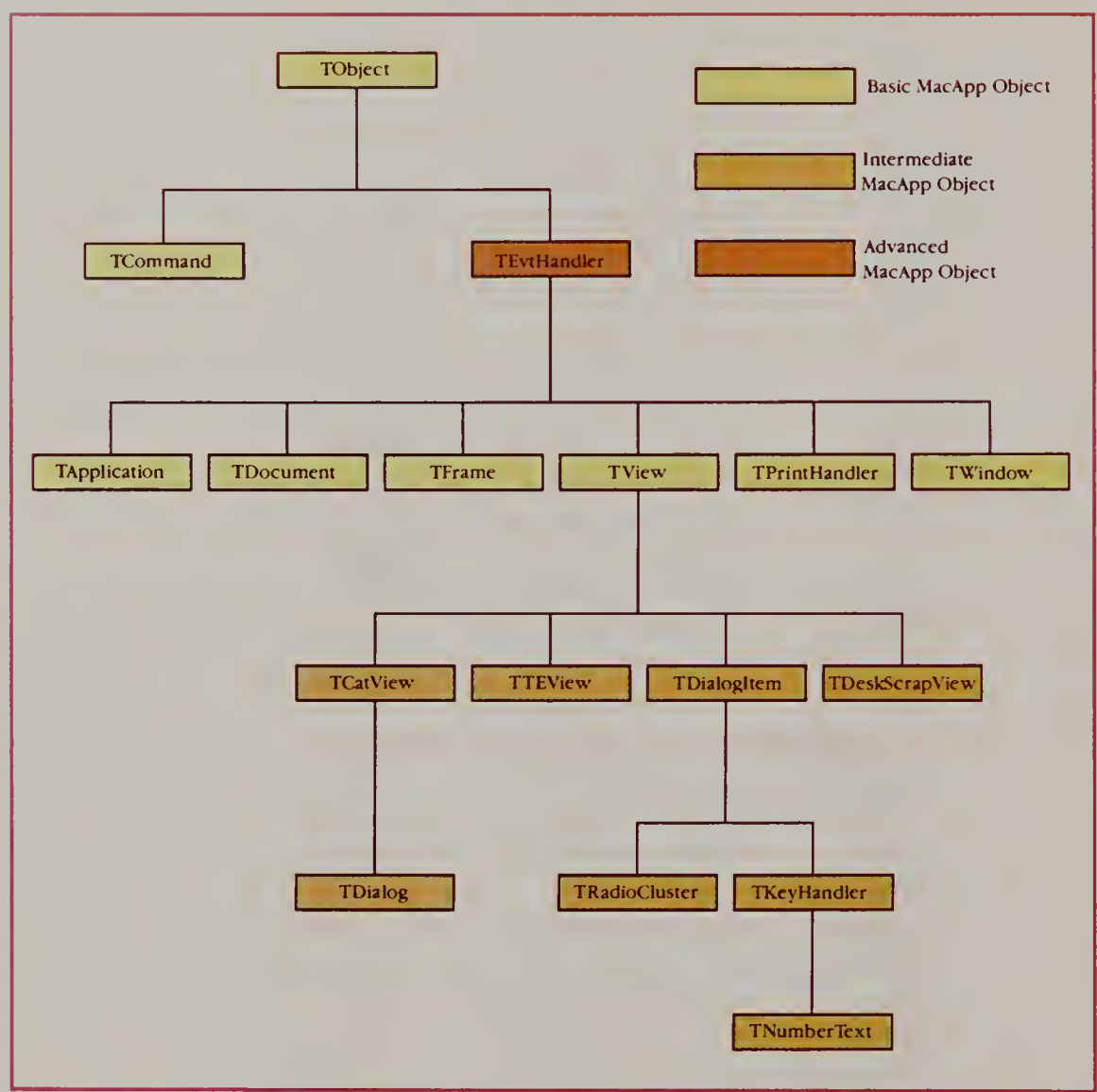

Figure 1
The MacApp class library inheritance structure divided into levels. Note that there are only about eight basic objects that the beginning MacApp programmer must learn. The intermediate objects will be commonly used by Mac developers. The advanced objects, however, will be used only in applications with special requirements.

stand-alone Macintosh applications, desk accessories, and MPW tools.

The MPW Pascal compiler updates the Lisa Pascal compiler used in the Lisa Workshop. Like Lisa Pascal, MPW Pascal has a number of special features. For example, you can separately compile program fragments, called *units*. You can also perform bit operations and pointer arithmetic–features normally associated with the C language. MPW Pascal also lets you compile in-line functions, and you can call functions written in C and assembler.

In addition, MPW Pascal has provisions for declaring complex record types, a feature that lets you easily manipulate many of the QuickDraw and other Toolbox data types. For example, you can create a function that computes a rectangle as follows:

```
FUNCTION MySpecialRectangleConstructor
  (x, y:INTEGER): Rect;
```

You use handles to refer to objects in MPW Pascal. While there are a few exceptions, you can reference most objects as you would a variable. For example, to refer to the instance variable **fExtentRect** of an object referred to by the variable **myQuad**, you would type **myQuad||.fExtentRect** rather than **myQuad↑↑.fExtentRect**.

Development Building Blocks–MacApp

For years hardware designers have been able to plug commercial chips together to create new designs. Now MacApp brings the building-block approach to software design. MacApp is a class library of about 30 object types that include many of the features of the Macintosh user interface (see "What's in MacApp and What's Not"). You can use an object as is or modify it.

Together with the MPW tools and MPW Pascal, MacApp can be used to implement stand-alone Macintosh applications. However, you can't use it to create desk accessories or MPW tools, since these projects require a different architecture than that currently implemented by MacApp. When you use MacApp with MPW Pascal, the productivity gains are phenomenal.

MacApp's objects can be thought of in two ways. To see how an object is derived, it's useful to look at it from the perspective of inheritance structure (see Figure 1). Such a view is indispensable when you are designing a new object and need to ensure that it inherits the right attributes.

Just as objects are more than merely a loose collection of data structures and procedures, MacApp is more than just a library of random objects. The Mac-

App objects are interconnected in ways that are reflected in the software design of most Mac applications. When you build a new application by combining objects in the MacApp library with new objects, it's useful to look at the interconnections between objects during program operation (see Figure 2). For example, the basic MacApp object TDocument has instance variables linking it to the windows that display it on the screen (fWindowList) and to the object that knows how to print the document (fDocPrintHandler). It has procedures for generating the object called Views, which will render the document on the screen (DoMakeViews) and the windows that will contain these renderings (DoMakeWindows). These interconnections and the interconnection chain of the objects the document is linked to constitute an *application framework,* that is, a fully functional but as yet "blank" Macintosh application.

Building a New Application

To build a new application—hypothetically named Foo—with MPW Pascal and MacApp, you would use the MPW editor (see Figure 3) to construct the following five files:

- MFoo.p, the short main program for Foo. This file would be only about a dozen lines long.
- UFoo.p, the interface portion of the separately compilable unit containing all the objects that are unique to the Foo application.
- UFoo.incl.p, the implementation portion of the UFoo.p unit.
- Foo.r, the input to the resource compiler, Rez, which will construct the resources needed by Foo.
- Foo.make, the file that describes how to build the finished application.

The five files constituting the application would be compiled and linked with the aid of command files called *make scripts* included with MacApp.

Once an application is built, you can run and debug it without leaving the MPW shell, since debugging code is linked with each MacApp application by default. (You can, of course, remove the debugging code prior to shipping the application.) MacApp's debugging facilities are impressive (see Figure 4). You can set breakpoints in any method, see the objects and the methods associated with the stack, step through one method at a time, or turn on the trace feature to list the methods as they are called. You can also inspect the internal values of any object when you run the program.

The MacApp debugger is the only source code debugger included with MPW—a clear deficiency in MPW. The debugger runs on any Mac except the 128K variety.

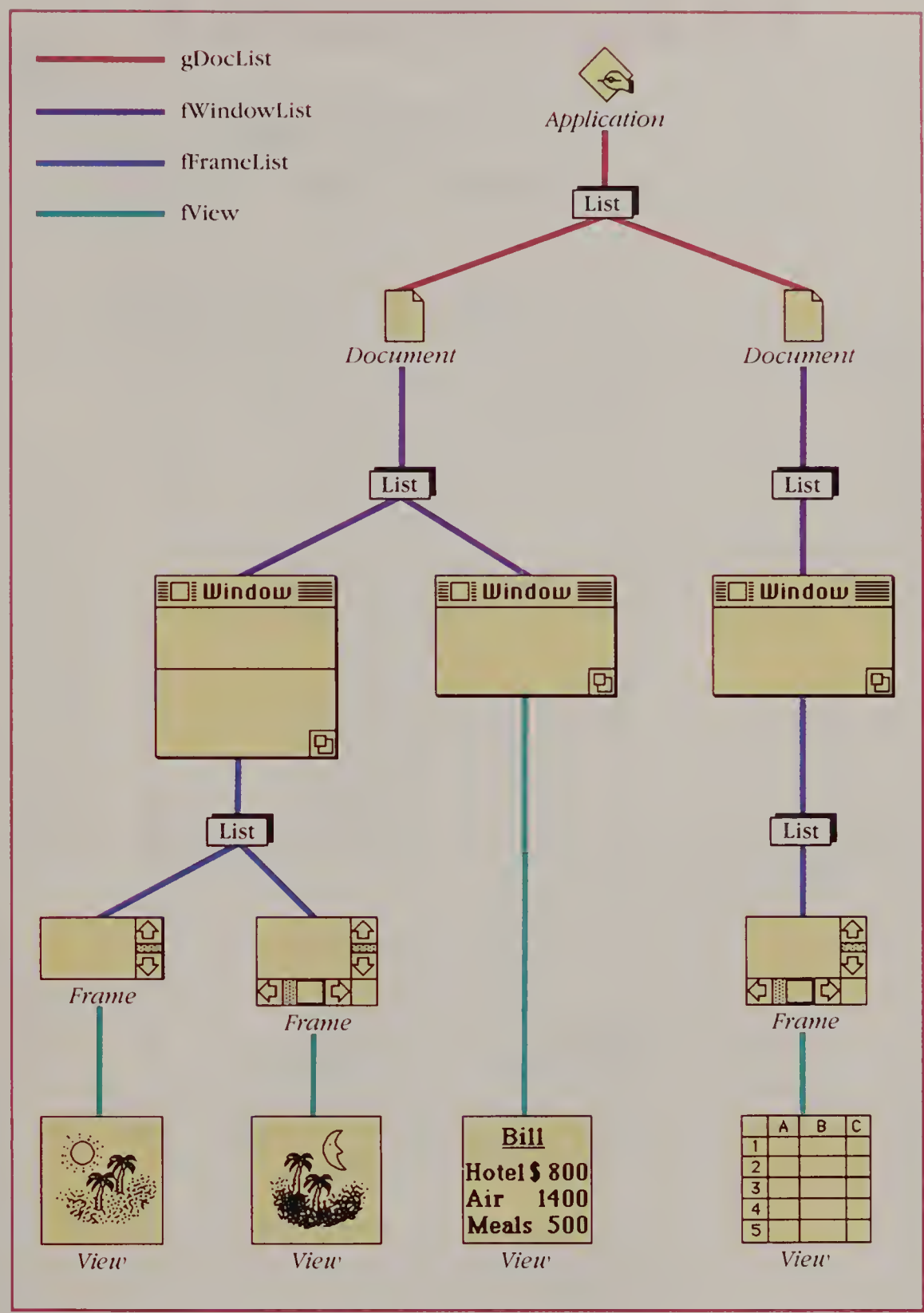

Figure 2

At run time the MacApp objects are interconnected, providing the basic structure of a Macintosh application. The interconnections, shown in this figure for a small Mac application with three separate windows, include a list connection from the application object to all its document objects, a list connection from a document to all its window objects, and a connection between each window object and its View object. The View object draws the interior of a window.

What's in MacApp and What's Not

The MacApp library includes objects that let you easily create the following application features:

- Multiple document types (as in *Jazz*).
- Multiple windows, all of which move, scroll, and resize correctly (as in *Microsoft Chart*).
- Multiple views of the same data (as in *MacProject*).
- Highly structured, complex windows (as in *Red Ryder*).
- Selection and drawing with the mouse (as in *MacProject*).
- Palettes (as in *MacPaint*).
- Simple text editing (as in *MacDraw*).
- Printing on both the ImageWriter and the LaserWriter.
- Cut, copy, and paste—both inside of one document and between documents—using the Clipboard.
- Modal and modeless dialog boxes.
- Undoable menu commands and other operations.

The features MacApp does not directly provide include:

- Multipane splittable windows (as in *Microsoft Word*).
- General multifont, multistyle text editing (as in *MacWrite*).
- Large views (32-bit drawing coordinates).
- Multilevel undo.

Just before you ship your application, you can run the Object Optimizer, an MPW tool, to reduce the application's size and increase its speed. I used MacApp to build two stand-alone Mac applications and found it easy to use, well documented, and, for a prerelease version, relatively bug-free. Developing a program with MacApp requires a hard disk, and at least a megabyte of memory for the compiler. MacApp itself will not run on a 512K Mac, although applications written with MacApp can run on all Macintoshes.

MacApp comes with sample programs that demonstrate the myriad effects the library's objects enable you to achieve. One portion of the MacApp documentation, the "MacApp Cookbook," contains the recipes for tasks like creating a multiwindow document and handling several types of mouse events. The cookbook is an ideal way for novices to learn about objects.

Even with its limitations, MacApp will change the way Mac software is developed. Together, MPW, MPW Pascal, and MacApp form a powerful development facility that will meet the needs of the most demanding Macintosh developer and yet still be usable by the weekend programmer.

The Assembler

The Macintosh Workshop Assembler is a tremendous step up in power from both the Lisa and MDS assemblers. It generates code for the 68000, 68010, and 68020 microprocessors, the 68881 floating-point coprocessor, and the 68851 paged memory management unit. In addition, the assembler has a powerful macro facility and directives, as well as the ability to optimize "generic instructions."

The assembler has built-in macros that your programs can use. A few examples include a macro that performs string manipulation, one that creates or modifies symbol tables, and one that lexically parses a string.

You can also write your own macros. For example, you could emulate C case statements with a macro. Directives give you the power to define code and data modules easily or to set up templates, or data structures. These templates are similar to records in Pascal or structures in C. The assembler also includes directives that control assembly for the various 68000-family chips and other directives that import and export global variables between modules.

One final feature of the assembler is that under certain conditions it optimizes source code instructions for size and execution speed.

To make the conversion from the Lisa Workshop or MDS to MPW as painless as possible, Apple provides three conversion tools: TLACvt, MDSCvt, and CvtObj. These programs convert Lisa assembler source files,

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MDS assembler source files, and Lisa object files (created by the Pascal compiler or the Green Hills C compiler and the MPW Assembler) to their MPW counterparts.

The MPW C Compiler

The Macintosh Workshop C Compiler is a complete implementation of the C language as defined in *The C Programming Language,* by Brian Kernighan and Dennis Ritchie (Prentice-Hall). Developed by Green Hills Software, the compiler includes many of the common extensions to the C language. A complete set of include files and library files, which let you use both Macintosh and standard C data definitions and functions, comes as part of the package.

The compiler extensions include enumerated and void types. The compiler lets you make structure assignments and use structures as function arguments or results. You can also declare and call Pascal functions. The Standard C library is based on the C library for AT&T's UNIX operating system. Macintosh interface libraries are provided to access the routines described in *Inside Macintosh,* and the C SANE library supports the floating-point routines described in the *Apple Numerics Manual* (both published by Addison-Wesley).

Summary

No development system on any personal computer currently provides even half the features available to MPW users. The flexibility and extensibility of the MPW shell combined with the powerful assembler, compilers, and other tools will make MPW the new standard against which other development systems will be judged. In addition, the onslaught of new, more powerful tools that will no doubt be released by third-party companies will increase the power of MPW even more.

Put simply, MPW is *the* system for serious software development on the Macintosh. □

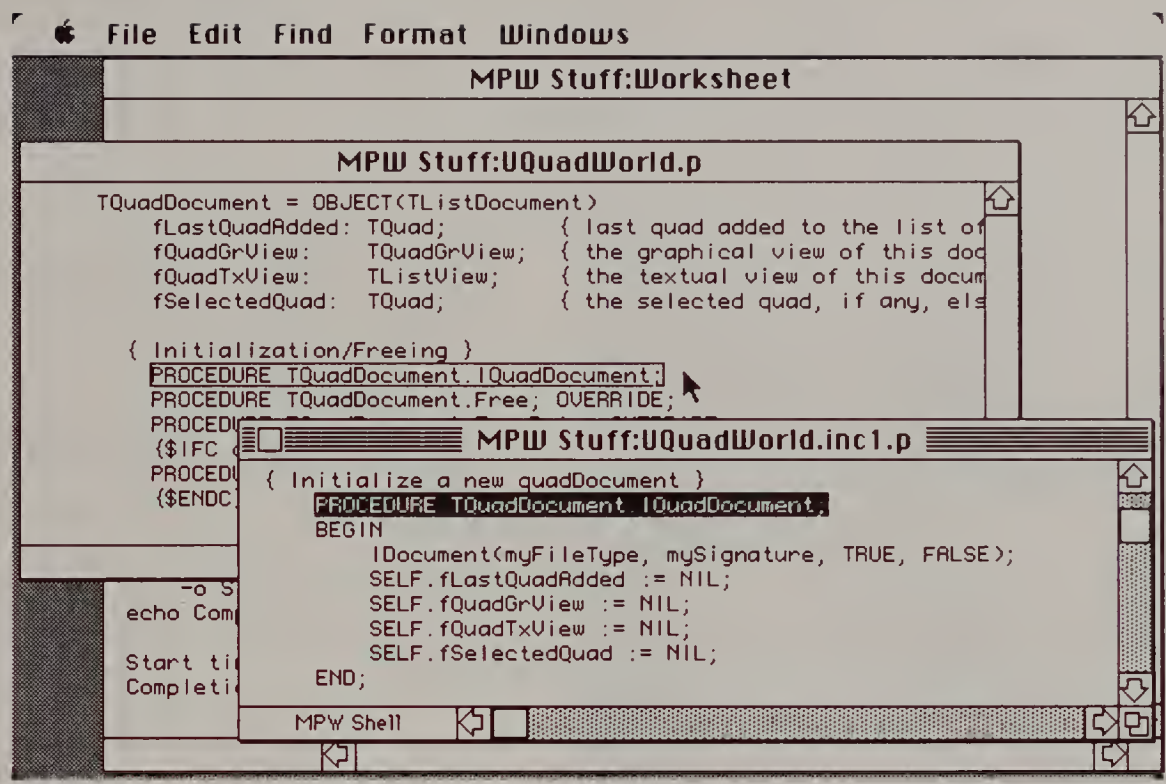


Figure 3
Programming an application using MPW Pascal and MacApp. Note the small panel in the lower-left corner of the active window; the panel shows which MPW tool is currently executing.

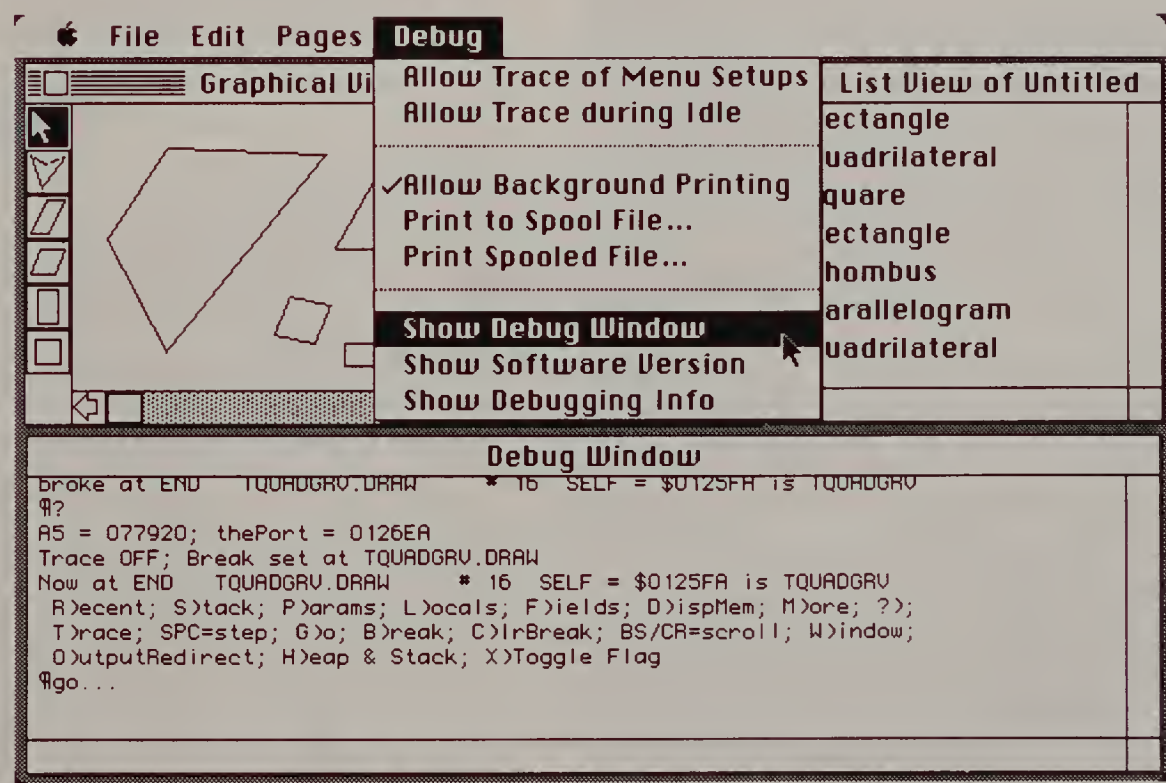


Figure 4
The MacApp source-level debugger in use. The debugger installs a special Debug menu and Debug window into any MacApp application.

Art to Go

A compendium of clip-art collections

by Erfert Nielson

At the dawning of the Macintosh era, when most developers were laboriously compiling Mac software on the Lisa, several enterprising entrepreneurs used one of the few existing programs–*MacPaint*–to produce disks of graphics. Since those software-starved days, clip-art libraries have increased in number, variety, and sophistication. Subject matter runs the gamut from monsters to architectural symbols. More traditional fare–pointing hands, arrows, stars–is also available. Based on popular catalogs of public-domain graphics, the on-disk images have the advantage of being reusable and modifiable.

Who uses clip art? In general, anyone who publishes with the Macintosh is a candidate. *MacPaint* or *MacDraw* images can be pasted into page-layout programs such as *PageMaker,* as well as into documents created with a word processor. Many people create their own clip-art libraries to add decorative touches to letters, memos, fliers, or advertisements. And now that Macintosh files can be typeset as well as laser-printed, a growing number of newspapers turn to the Mac for their graphics needs. The art department at *USA Today,* for example, makes MicroMaps' *MacAtlas* the basis for many illustrations.

In the coming months, you can expect to see commercial clip art appearing on line. The Minneapolis-based Speed>S electronic delivery service already offers ImageWorld's complete graphics collection and plans to provide other clip-art libraries in the future. Rather than purchase clip-art disks, Speed>S subscribers download individual files by modem. Alphabet Soup, a San Francisco company, also plans to provide graphics libraries on its DesigNet network.

More than 30 companies now offer clip-art disks or disk collections. The following minireviews summarize and rate each company's offerings. In the case of companies that sell more than four disks, I have provided a general overview of the line instead of disk-by-disk descriptions. The reviews also list the number of files, or one-page documents, on a disk (a file can contain from one to several dozen images) and state whether the package includes a printed catalog of the images. The disks contain *MacPaint* images unless otherwise indicated.

The quality of clip-art collections varies considerably. The task of rating the libraries is complicated by the fact that many disks feature the work of several artists with different styles and skill levels. Each disk or collection has been given a rating of up to five stars. These ratings, of course, reflect my opinion. The sample drawings from each collection, however, should help you judge for yourself.

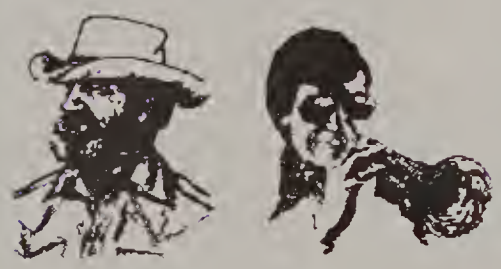
A. A. H. Computer Graphic Productions

Bytes of Fright ★★★★ A rogue's gallery of mummies, monsters, skeletons, chainsaw murderers, vampires, and other creepy creatures—17 files in all. Not exactly standard desktop publishing fare, but skillfully drawn and reasonably priced. Good for Halloween cards or morbid memos. List price: $29.95.

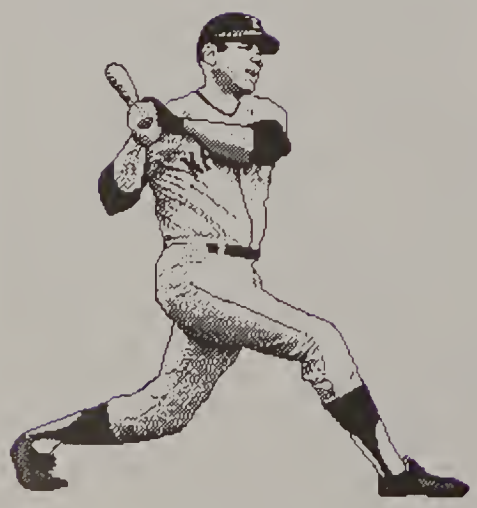
Fantasy, Horror, and Science Fiction ★★★★ Twenty-one files featuring knights in armor, monsters, mythological creatures, and fanciful borders. Many of the files contain only one drawing, and several of the illustrations cover almost a page, making them impractical as decorative elements. A good collection, however. List price: $29.95.

Sky Bytes ★★★★ Aircraft through the ages, from the first flying machines to today's spacecraft. The 17 files include fighter planes, helicopters, airliners, experimental aircraft, and balloons. Many of the aircraft are labeled and dated. List price: $29.95.

AD-Techs

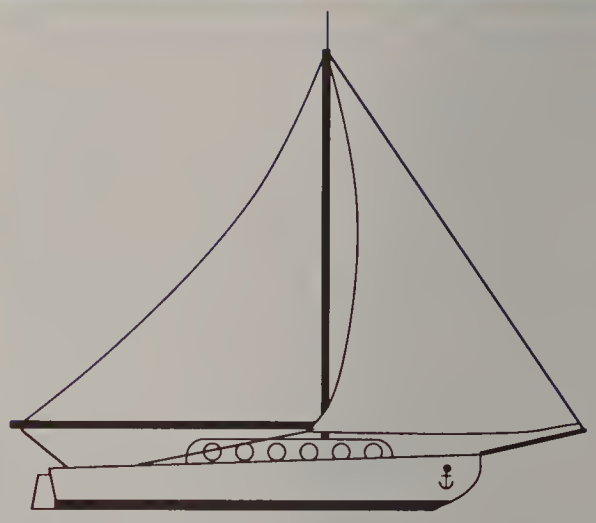


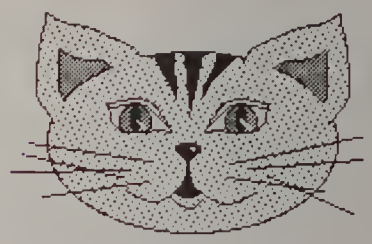
EZ Graphix ★★ A four-disk set of images encompassing almost every conceivable category. The professions are emphasized, with files depicting tools of the trade for doctors, photographers, contractors, plumbers, welders, and auto mechanics, among others. Other files feature modes of transportation, animals, insects, flowers, food, and office items. Most drawings are in a realistic style; some are digitized from photos. Many of the images are muddy, and some have edges awkwardly chopped off. Catalog included. List price: $97.50 plus $3 shipping.

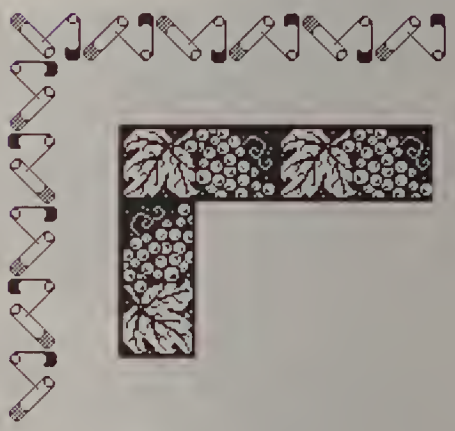


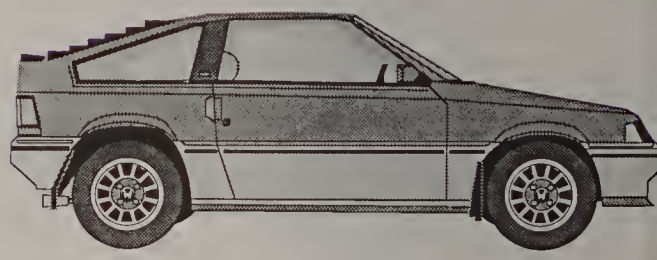
CompuCraft

Mac Art Library ★★ This 11-disk set comprises the following titles: Animals, Buildings, Flowers/Trees, Geography, Greeting Card, In the Kitchen, On the Farm, Signs/Symbols, Sports, Tools, and Transportation. Disks contain from 15 to 25 files of images, most of them digitized photographs touched up with varying degrees of success. Rather than buying the set, I'd invest in a ThunderScan digitizer and produce my own images. List price: $39.95 per disk; $200 for all 11.









Compuset

Clip Art, Volume 1 ★★ Available in PICT (object-oriented) or *PictureBase* format (see "Clip Tips" for a description of *PictureBase*), the images on this disk can be pasted into *MacDraw, MacPublisher II,* or other programs that support PICT files. The prerelease disk I viewed sported the following categories: transportation, food, restaurant items, borders and arrows, and miscellaneous design elements. Unfortunately, most of the drawings are simple shapes or outlines, not as impressive as the other *MacDraw* clip art reviewed. List price: $39.95.

Decision Science Software

Soft Palette: Clip Art, Volume 1 ★ Twelve files in subject areas including animals, flowers, food, holidays, and *MacPaint* patterns. The drawings are simple–a sort of computer folk art. Not one of the better collections. Catalog included. List price: $35.

Soft Palette: Borders, Volume 1 ★★★ Seventeen files containing 160 decorative border designs in a variety of motifs: abstract patterns, flowers and plants, animals, holidays, food, and miscellaneous objects. Catalog included. List price: $35.

Desktop Graphics

DrawArt ★★★ Twenty-seven *MacDraw* files arranged in six categories: Drawings, Publishing, 3D/CAD, Clip Art, Cartoons, and Drafting. The disk features a number of drawings created with other drafting or CAD programs (Challenger Software's *Mac3D* and Bridgeport's *EZ-Draft,* for example) and saved in *MacDraw.* For the most part, the drawings that originated in *MacDraw* are the most impressive, most notably the bicycle and the motorcycle. A good, but uneven, collection. List price: $49.95.

Dynamic Graphics

DeskTop Art: Artfolio 1 ★★★★ A two-disk set, with 26 files spanning a variety of subjects, including animals, famous people, professions, and faces. The images are small enough to work as decorative art in newsletters. A catalog of images and an excellent hint book are included. List price: $74.95.

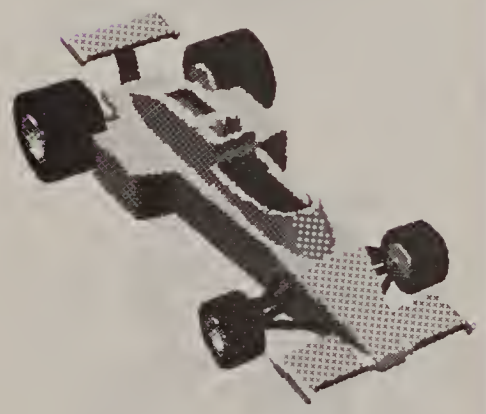
DeskTop Art: Graphics & Symbols 1 ★★★★ A two-disk set with 29 files covering categories such as seasons, sports and hobbies, holidays, politics, occupations, and household items. Most of the images measure about 3 by 3 inches. Drawings are bold and simple, and most of them are attractive (some are too cute for my taste, however). A catalog of images and an excellent hint book are included. List price: $74.95.

Electronic Publisher

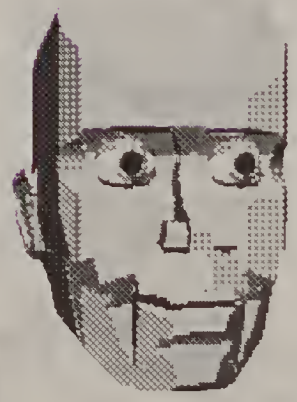
MacMatbook ★★★ A three-disk set arranged as *PictureBase* libraries. Nature and Transportation offers 43 files; Hardware, People, and the Arts has 42; and Animals, Food, and Potpourri has 49 files. It's hard to rate this set, since the images vary widely in style and quality. Many of the illustrations are drawn in a cartoon style; others resemble woodblock prints. Most of the drawings are fairly large. List price: $99.95.

Enabling Technologies

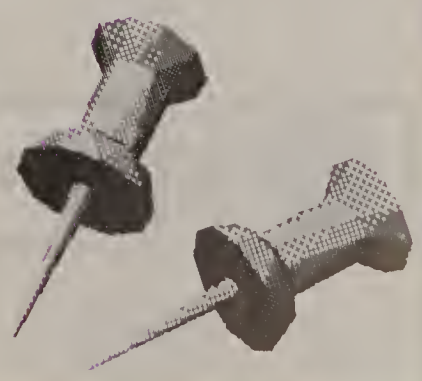
Clip Objects, Volume 1 ★★ A novel idea–three-dimensional clip art. The *Easy3D* images include a male figure, a female figure, a hand, a racing car, and four island areas: the Canadian Islands, Indonesia, Tasmania, and the Caribbean. (No offense to our Tasmanian readers, but I don't think many people will find a use for the island files.) You can change drawings' size, orientation, and lighting in *Easy3D* and then transfer them to *MacPaint* for detail work. Impressive images, but limited in detail by the medium. List price: $49.95.



Clip Objects, Volume 2 ★★★ Six files of *Easy3D* art: a human head, a wig and glasses to place on the head, a beautifully rendered bicycle, a globe, and a space shuttle. It's fun to play with the images–rotating the globe, shrinking the head, and generally moving the objects in three-dimensional space, but the collection's use as decorative clip art is limited. (You can achieve some interesting effects, however, by making multiple screen shots of objects as you rotate or resize them.) List price: $49.95.



Desktop Publishing Objects, Volume I ★★★★ More versatile than the other 3-D art disks, this one offers 99 files in four basic categories: shapes (heart, star, crescent, chevron, and so on), geography (maps of the world, the United States, and



individual U.S. states), symbols (miscellaneous objects such as a pushpin, a pencil, a paper clip, and arrows), and type (the letters of the alphabet, various punctuation, and special symbols). A useful collection for desktop publishers. List price: $49.95.

Enzan-Hoshigumi Company/ Qualitas Trading Company

Japanese Clip Art, Volume 1 ★★★★★ Calligraphy, flowers, landscapes (including Mount Fuji, of course), animals, temples, decorative designs, samurai, and so on. Many images in the disk's 11 files are based on traditional paintings. The subject matter is limited to Japanese themes, but the drawings are so beautiful that I'd recommend this disk to anyone who collects decorative clip art. List price: $79.95.

Japanese Clip Art, Volume 2 ★★★★ Like Volume 1, this volume contains expertly rendered drawings of Japanese subjects. The 14 files include demons, landscapes, masks, religious symbols, calligraphy, and mythical creatures. Catalog included. A bit expensive, but a quality collection. List price: $79.95.

GoldMind Publishing

MacGraphics ★★★★ An 11-disk collection: Transportation, Animals, Trees, Sports and Recreation, Tools and Household Items, Food and Beverages, People, Occupations, Caricatures, Romance in the 19th Century, and Signs and Symbols. Some images are digitized versions of public-domain illustrations, while others are drawn by hand. Styles vary, from cartoons and caricatures to realistic renditions. A good collection overall. List price: $24.95 per disk, $195 for 11-disk set.

Image Club

Digit-Art ★★★★★ A three-disk set of *MacDraw* images. The Clip Art disk has 27 files in the categories Travel, Miscellaneous, Entertainment, Sports, and Labelers (disk and envelope labels and a postcard template). Fonts offers six fonts (individual letters created in *MacDraw*), many of them with variations such as shadows or fill patterns. The Art Room disk's 22 files provide a calendar, borders, frames, arrows, stars, and other decorative elements. Drawn with precision and skill. Catalog/hint book included. List price: $99.

Clip Tips

If you have an extensive collection of Macintosh clip art, you may spend a good deal of time rummaging through disks to find the images you need. Several accessory programs can help you store and retrieve documents in your art collection more efficiently.

PictureBase

Many people have arranged their clip-art collections by category on floppies or on a hard disk. That way, simply opening a folder called Holidays brings up a group of related documents, but you still face browsing several files to find a specific picture.

Symmetry's *PictureBase,* a database for *MacPaint* and *MacDraw* graphics, helps you organize and retrieve clip-art images. When building a library of images with *PictureBase,* you not only place each picture in an appropriate category but also assign it one or more keywords. You can then search the database by keyword and find all related images.

To date, the following companies distribute their graphics as *PictureBase* libraries or plan to do so: Colophon, CompuSet, Desktop Graphics, Electronic Cottage Industries, Electronic Graphic Images, Image Club Graphics, ImageWorld, John Wiley and Sons, MicroMaps, Pleasant Graphic Ware, and T/Maker Graphics. (See *Macware Reviews, Macworld,* July 1986, for a review of *PictureBase.*)

Multi-Scrap

If you have a large clip-art collection but a small budget, you might consider organizing your drawings in a series of on-disk

Scrapbooks. *Multi-Scrap,* a public-domain desk accessory, lets you keep several Scrapbook files on one disk or even choose among multiple Scrapbooks on multiple disks.

When you install the desk accessory with Apple's Font/DA Mover, *Multi-Scrap* replaces the application's regular Scrapbook. You can create a separate Scrapbook for each category of clip art: animals, alphabets, holidays, and so on. A *Multi-Scrap* utility creates icons that allow you to see what Scrapbooks are on a disk when you open the disk's desktop icon. *Multi-Scrap* is available from many user groups. If your local group doesn't have it, contact the Berkeley Macintosh Users Group.

QuickPaint and Art Grabber+

Anyone who has used *MacPaint* knows how tedious it is to search for a drawing by closing one document and opening another. Two accessories, Enter-Set's *QuickPaint* and Spinnaker's *Art Grabber+,* can speed up your document browsing.

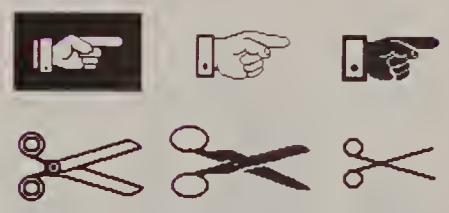
The programs, which are nearly identical, work as desk accessories in *MacPaint.* When you select the desk accessory, a MiniFinder appears. The document you open appears in a scrollable window, from which you can copy an image to the Clipboard. Both accessories let you copy images that are larger than *MacPaint*'s drawing window. The programs can also be installed as desk accessories in other programs, allowing you to scan and copy *MacPaint* pictures without ever opening *MacPaint.*

ImageWorld

MacMemories ★★★★★ Fifteen disks of turn-of-the-century artwork, digitized from original drawings and engravings. The series includes the following disks: Apples of Our Eye (children); Art Nouveau; Attention Grabbers; Butcher, Baker and Candlestick Maker; Catalogue; Fish, Fur and Fowl; Memory Lane; Seasons and Holidays; Silhouettes and Shadows; Tools, Machines and Merchandise; Twig, Leaf, Root and Flower; Wheels, Hulls, Rails and Wings; Wild, Wild West; Borders, Frames and Signs; and Christmas and Winter. An excellent collection. List price: $39.95 per disk, $399.95 for 13-disk set, catalog $5. You can buy individual images from the Speed>S electronic delivery service; price depends on the size of the file.

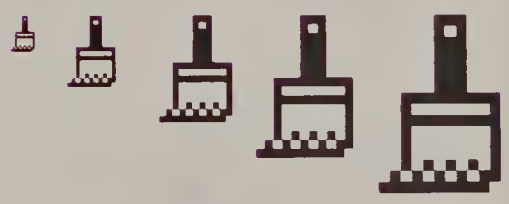
Kensington Microware

Maccessories: Graphic Accents ★★★ Thirty-five files in miscellaneous categories such as borders, arrows, office items, computers, government, holidays, and sports. Fair quality. Lots of files, but lots of white space too. Catalog included. List price: $49.95.



MacPoint

MacBits ★★ This three-disk set features over 60 Macintosh icons of various sizes. The collection comprises MacPaint Icons, Applications Icons, and System Icons and Symbols. These libraries might prove handy for user-group newsletters and other Mac-oriented publications, but most of the images can be easily produced by taking a screen shot (⌘-Shift-3). The System Icons disk is the most useful, offering hard-to-capture icons such as the error bomb and the watch pointer. List price: $50.

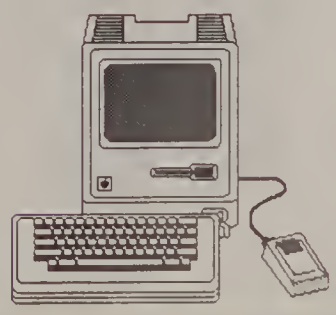


Magnetic Arts

Miscellaneous disks ★ Magnetic Arts offers five disks: Romantic Images, Landscapes, Faces, Portraits of Prince, and Portraits of the 49ers (the football team, that is). Most of the disks contain digitized images (why anyone would want 24 files of digitized pictures of Prince is beyond me). The Faces disk offers some digitized images, some hand-drawn ones, and several hybrids. I don't recommend these disks. List price: $39.95 each.

Magnum Software

McPic!, Volume 1 ★★★ An old-timer among clip-art disks, this volume has 19 files in categories such as animals, as-



trology, business (office items, computers), holidays, nature, people, sports, symbols, and transportation. The quality of the artwork varies. Includes a hint manual. List price: $49.95.

McPic!, Volume 2 ★★ These 21 files span categories such as flags, animals, music, household items, maps, and textures (wood grain, pebbles). The disk also includes a face-construction kit. Adequate, but not impressive overall. Includes a hint manual. List price: $49.95.

MicroMaps

MacAtlas ★★★★ A two-disk set, available in either *MacPaint* or *MacDraw* format, depicting the countries of the world, all 50 United States, and the counties in each state. These well-drawn maps can be customized for reports or presentations. Hint book included. List price: set $199, World $79, United States $79, U.S. counties $119.

Miles Computing

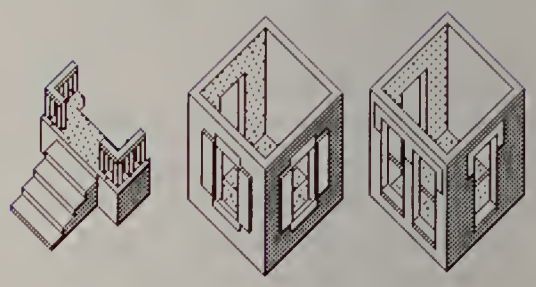
Mac the Knife, Volume 3: Mac the Ripper ★★★★ This two-disk set is a delightful collection of decorative elements: borders, letters, holiday motifs, and designs from art nouveau foliage to Toulouse-Lautrec dance-hall girls. The drawings are characterized by a lightness and spontaneity not found in most clip-art illustrations. Includes a hint book and a catalog. List price: $49.95.

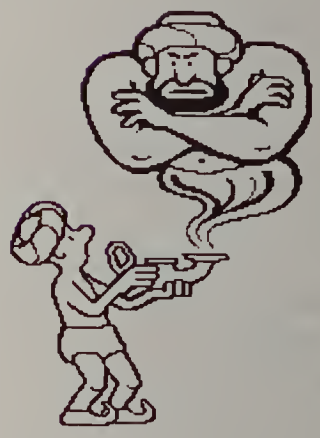
Pleasant Graphic Ware

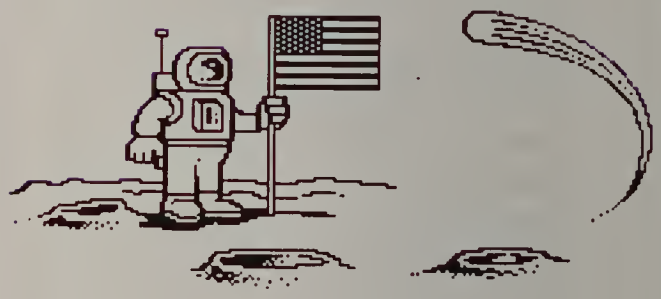
SmArt Mouse ★★★ This disk features 34 files in eight categories: animals, plants, travel, people, food, holidays, activities, and the Orient. Drawing styles vary, and quality ranges from good to mediocre. Pleasant, but nothing special. Available in *MacPaint* or *PictureBase* format. List price: $39.95 plus $2 shipping.

Simon & Schuster Software

Mac Art Department ★★★ Eighteen files in categories that include animals, plants, tools, sports, borders, buildings, food, office and household items, and music. A 96-page book shows the images and gives tips ranging from the useful (press the ⌘ and Option keys to make multiple copies of an image) to the silly (enlarge the drawing of a violin to make a cello). A solid collection overall, but drawing quality varies. List price: $39.95.







Something Magical Interface/ Qualitas Trading Company

Mac Chopsticks, Volume 1: Japanesque ★★ Seventeen files that pursue a Japanese theme: lanterns, calligraphy, origami, toys, flowers, and symbols. A wide range of subject matter is included, but the overall quality of the drawings is only fair. Includes catalog. List price: $49.95.

Spinnaker Software

da Vinci Graphics Series: Building Blocks ★★ This disk is a unique idea: 14 files of pieces, or blocks, in styles from Bauhaus to farmhouse, which you assemble into buildings. Files include blocks for skyscrapers, villas, houses, and gardens. Fun to play with, but the blocks are confined to 45-degree angles, giving your creations a somewhat odd perspective. Hint book/catalog included. List price: $79.95.

Springboard Software

Art a la Mac, Volume 1: People and Places ★★★ Fifteen files that feature maps, buildings, a face-construction kit, and human figures engaged in sports, various professions, and other activities. The drawings were done by two artists and are of uneven quality. Many are in a whimsical cartoon style, while others look a bit sketchy. Includes catalog. List price: $39.95.

Art a la Mac, Volume 2: Variety Pack ★★★ As with Volume 1, the illustrations on this disk come in a variety of drawing styles. The 14 files include decorative letters, borders, astrological symbols, holidays, monsters, vehicles, and pictures with religious and outer-space themes. Overall quality is fair. Includes catalog. List price: $39.95.

SunShine

SunShine Graphics Library ★★★★ A set of 32 disks, with illustrations ranging from the beautiful to the bizarre. Most of the images are digitized versions of old prints and drawings, carefully retouched in *MacPaint*. Categories include art nouveau borders, floral designs, nudes, fanciful animals, knights in armor, Mayan ruins, Oriental cutouts, birds, and insects, to name a few. Be forewarned that many of the images are large, filling almost an entire page. This collection is worth looking at, and the price is right: $12 per disk, or $10 per disk for orders of three or more.

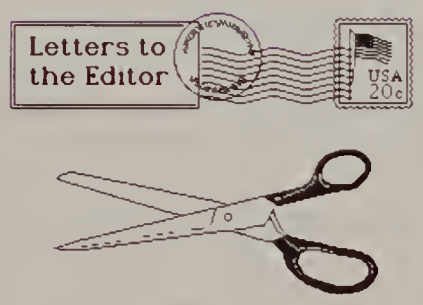
T/Maker Graphics

ClickArt Business Image ★★★★ The disk's 21 files include images for newsletters and business letterheads: borders, map symbols, arrows, abstract shapes for logo design, miscellaneous symbols, and transportation. Overall, this is a good collection, although a large percentage of the files consists of stylized lettering; if you don't like the style, you're out of luck. List price: $49.95.

ClickArt Holidays ★★★ Thirteen files of holiday images, including Christmas, Easter, Halloween, Hanukkah, Thanksgiving, and Valentine's Day. The disk also provides a template to assist in creating four-fold cards. The images are competently drawn, but the set is not as good as some of T/Maker's other disks. List price: $49.95.

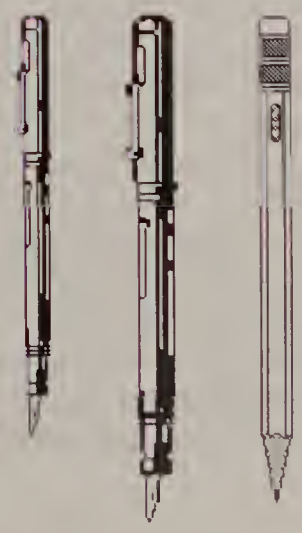
ClickArt Personal Graphics ★★ This was one of the first clip-art disks on the market and is a bit dated. For example, most people will have little use for portraits of Boy George and Fritz Mondale. The 28 files are filled with borders, cars, animals, arrows, and famous people. Many of the files hold only a single image, and drawing styles are mixed. Includes a short tips manual. List price: $49.95.

ClickArt Publications ★★★★ These images are intended for use in fliers, newsletters, and other desktop-publishing endeavors. The disk's 19 files include dingbats, borders, cartoons, desktop items, and decorative letters. Generally high-quality rendering. A good choice for an all-purpose newsletter disk. List price: $49.95.



Wiley Professional Software

Mac Art for Business ★★★ The 19 files on this disk are intended for office applications: memos, forms, correspondence, and the like. Subjects include arrows, borders, flowchart sections, lettering, pointing hands, and a variety of office items (notepads, telephones, and so on). Not bad, but nothing to correspond home about. Hint book included. List price: $23. □



Reviews

Sophisticated Statistics

StatView 512+ *1.0*

A professional statistics package. Pros: *Extensive set of advanced features; superior graphic output.* ***Cons:*** *No direct import of spreadsheet files or time-series analysis.* ***List price:*** *Version 1.1 $349.95.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

StatView 512+ is an integrated package designed for professional statistical and graphic data analysis. It's probably *the* program for those who require a complete set of statistical procedures, speed, and high-quality graphics. If you're mainly interested in financial applications, however, you'll find the lack of direct spreadsheet-file import a nuisance and the absence of time-series analysis a major omission.

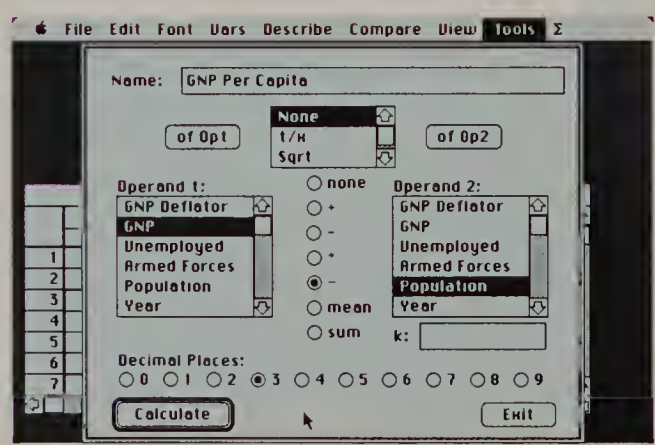
Performance by the Numbers

StatView 512+ data sets appear as numbers arranged in a spreadsheetlike form. The columns represent variables and the rows, cases of analysis. You enter the data after defining column heads and cases, or you can import the data from files in other programs via the Clipboard, but the file import is not direct. You are restricted to text format only, which means you could find yourself editing extra blank spaces to make *StatView 512+* read your old files correctly.

Once you have your data set entered, you can call up a comprehensive set of 35 statistical procedures from the Tools menu (see "Data Transformations").

Procedures, such as learning nonparametric methods, are easy to master. Mainframes or packages ported from mainframes, such as *Stat80* and *Systat,* require learning a command structure. *StatView 512+* lists commands in dialog boxes, which is generally convenient. However, building complex strings of commands entails calling up a dialog box for each additional command.

A comparison of a 5000-case data set using a mainframe statistical package (SPSS-X) showed *StatView 512+*'s speed to be quite impressive—approximately as fast as a VAX with ten student users. The size of a data set is limited only by available RAM. For example, a Macintosh Plus with 1 megabyte of memory and RAM cache turned off can perform a complete regression analysis on a data set of 10,240 cases.



Data Transformations
StatView 512+ *uses dialog boxes to select operations on data sets. The dialog box shows the creation of a new data column, "GNP Per Capita," which is the GNP divided by the population.*

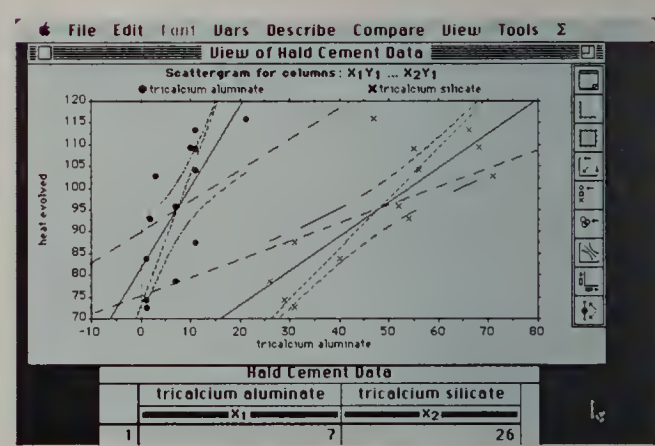
Peering into the Data

StatView 512+ integrates graphic displays with its statistical procedures. This makes it possible, for example, to plot the rotated solution of a factor analysis or the confidence bands of a regression equation (see "A Scatter Plot"). *StatView 512+* also provides scattergrams with optional cellulation (for overlapping data points) and produces standard bar charts, pie graphs, line charts, and box plots with a graphics quality rivaling that of *Microsoft Chart.*

The Works

As you would expect, *StatView 512+* has most of the required professional features—including mean, standard deviation, percentiles, skewness, and kurtosis.

StatView 512+ allows comparison of percentiles between variables and means using the t-test. Both one-group and two-group t-tests are available; the latter can be run for either paired or unpaired variables.



A Scatter Plot
StatView 512+ *presents results of calculations in view windows. This example shows the results of two simple regression analyses. The program plots the regression lines with associated confidence intervals for slope and true mean of* Y.

For general comparison of data sets, *StatView 512+* provides individual correlation coefficients for specified x-y pairs and the standard correlation coefficient matrix. The program lets you save a correlation matrix as input for a later procedure (such as factor analysis).

StatView 512+ provides simple linear regression, multiple regression, and polynomial regression models. The program calculates the following regression statistics: R, R2, adjusted R2, standard error, ANOVA table, residual statistics, beta coefficient table, and confidence intervals table. The plot of the regression line can be graphed. Data sets can include residuals, standardized residuals, fitted values, and predicted values.

One-way factorial analysis of variance includes multiple comparison tests—Scheffé, Fisher's PLSD, and Dunnett t-tests. Multiway factorial analysis of variance is possible with up to 16 grouping factors. *StatView 512+* allows unbalanced models and ANOVA models with missing cells. Repeated-measures analysis of variance models may be calculated with one within-factor and up to 15 grouping factors. Like their factorial counterparts, repeated-measures models may also be unbalanced.

For other types of data, *StatView 512+* offers chi-square goodness-of-fit tests and contingency-table analysis. *StatView 512+* can produce the cross-tabulation table and the following statistics: total chi-square, G statistic, contingency coefficient, Cramer's V, Phi (2 by 2 only), and chi-square with continuity correction.

For nonparametric statistics the program includes Mann Whitney-U, Wilcoxon Signed Rank, Spearman Rank Correlation Coefficient, Kendall Rank Correlation Coefficient, Kolmogorov-Smirnov, and Wald Wolfowitz Runs tests. Kruskall-Wallis and Friedman analyses are available for three or more groups.

Finally, *StatView 512+* provides a complete factor-analysis facility. You can enter data either in raw form or as a correlation matrix for faster processing. *StatView 512+* offers a choice of factor extraction methods: Principal Components, Kaiser Image, Harris Image, or Iterated Principal Axis. The program also lets you perform Equimax, Varimax, and Quartimax factor transformations.

For the Statistician

StatView 512+ is more suitable for scientists than for investors and for experienced statistics users rather than beginners. It combines sophisticated statistical features with a well-designed Macintosh interface and offers near-minicomputer levels of computational speed.—*Terry Ward*

See *Where to Buy* for product details.

ILLUSTRATIONS BY MARK ULRICH

Musical Interlude

Performer *1.22*

MIDI sequencer software. Pros: *Ease of use; ability to write/read professional composer files.* ***Cons:*** *Lack of tempo changes, subsequences, and sequence calls.* ***List price:*** *$295.* ***Requires:*** *512K.* ***Copy protection:*** *Key disk.*

Performer, by Mark of the Unicorn, is an industrial-strength MIDI sequencer for controlling the constantly changing world of synthesizers; with it you can record a musical performance, play back an exact rendition, then edit with pinpoint precision. In combination with *Professional Composer,* also from Mark of the Unicorn, *Performer* provides an invaluable link between recording music and traditional musical notation.

Performer's easy-to-use recording controls, which resemble a conventional tape recorder, tape counter, and metronome, appear on the screen (see "Rolling!"). A Tracks window lists the parts you're recording. To lay down another track, you add a new part to your track sheet and record on it. The program also offers a slew of powerful MIDI functions to handle tasks such as quantization, transposition, and crescendo.

The simplicity of the tape-machine design makes the program accessible, and the Mac itself acts as a metronome. Although *Performer* preserves subtle nuances of your playing by dividing a beat into 480 units, the program's editing functions force you to select, cut, and paste notes each time you want to change an arrangement. (Other MIDI programs enable you to define verses as distinct sequences that can be moved or called repeatedly.) *Performer* does not allow you to set repeat points within a piece.

Another input option, Step Time Entry, is well structured for those not playing music in real time. Select a rhythmic value, hit notes on the keyboard, and *Performer* enters each note and gives it the preselected value.

Performer is well documented and includes a chapter on advanced tricks, which is detailed, yet not overly technical.

Once you have input some music, you can manipulate the MIDI information in two ways. You can focus on one part by selecting it in the Tracks window; this calls up a new window that contains raw MIDI data. By altering the numbers in this window, you can change the timing, length, volume, and pitch of a note. The functions in the Regions menu let you effect global changes. You can define a region as a single note or an entire multiple-track piece. These functions range from simple Transpose and Reverse Time functions to more esoteric ones.

Several esoteric functions deserve special mention. An extensive Quantize function moves a note's start point or end point to the closest specified beat division, a technique used extensively in contemporary pop-music production. This often produces a rigid quality in the music, which you can alter through the Sensitivity option. The Quantize feature allows you to determine the percentage of notes that should be moved and also to define any tuplet. It enables you to transfer data into *Professional Composer* for printing out. Careful quantizing produces excellent output from both *Performer* and *Professional Composer.*

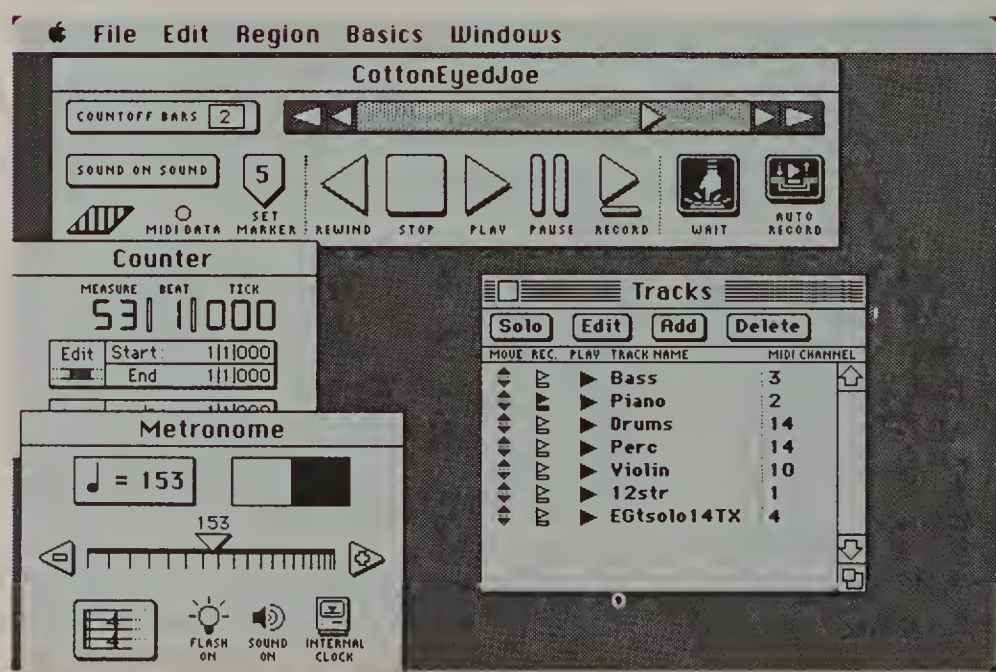
With the Split Notes function, you can "peel" off the top or bottom notes of a chorded part to construct a separate bass or melody track. Or you can split a thick piano part into right- and left-hand sections.

Only the Scale Time function proves disappointing. To change tempo within a piece, you must change the duration of each note relative to the particular piece's metronome speed. The Scale Time function alters the tempo by using a time compression/expansion ratio that you define. The only alternative is to slave *Performer*'s metronome to an external device that can record tempo changes.

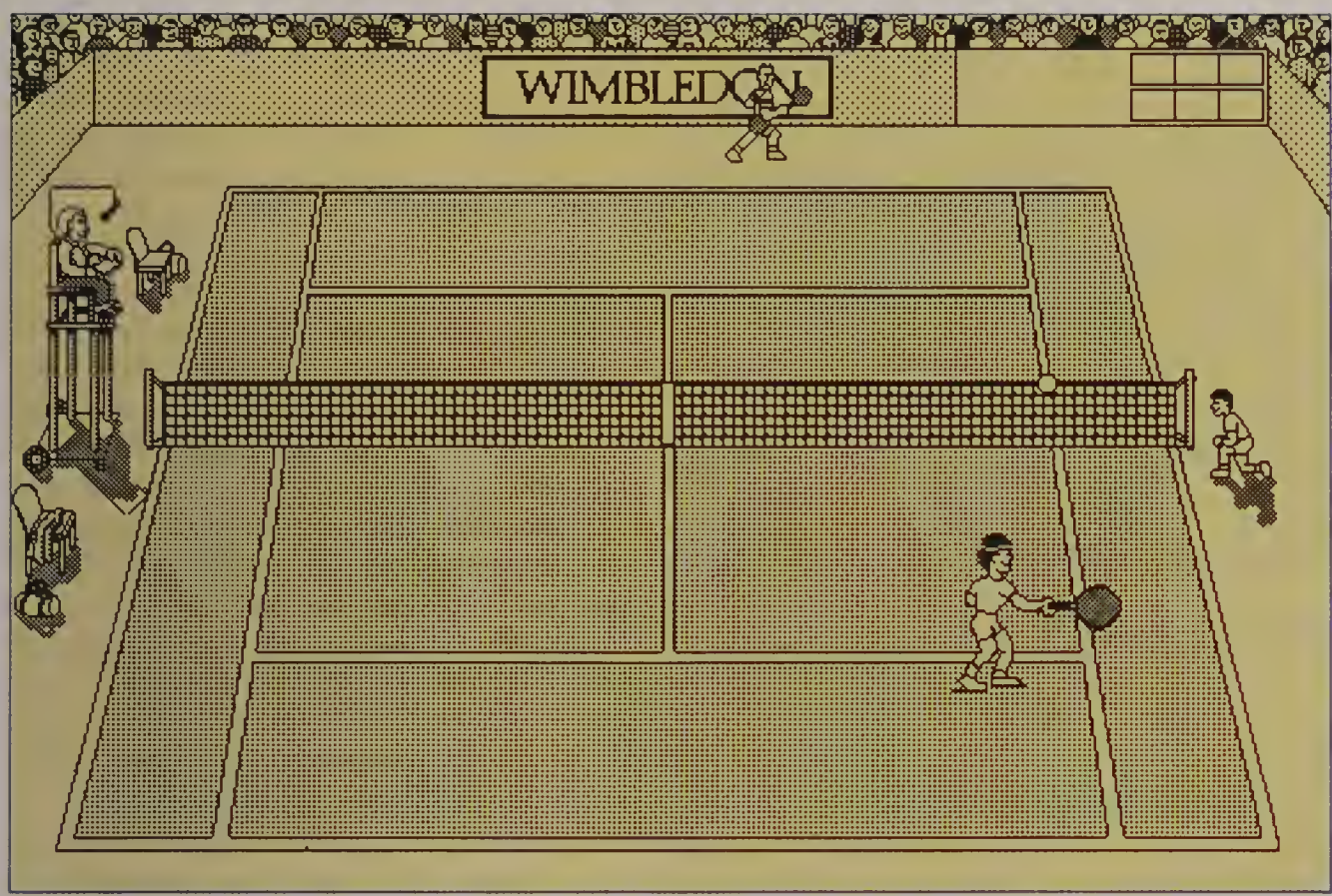
Performer's many windows do not always fit together comfortably on the screen. Adding to the confusion, some screen buttons—including Play and Record—remain operative when the Controls window is not active, while other windows still need to be selected before you can do anything in them. While such ever-active buttons allow rapid access to some operations, using certain desk accessories while playing or recording causes sporadic pauses in the music.

Performer offers powerful operations with a single synthesizer and really works wonders when coordinating a multi-instrument setup. Although *Performer* forces you to think linearly instead of chordally, it remains an impressive tool for music production.—*David N. Barnett*

See *Where to Buy* for product details.



Rolling!
The Controls window displays the title of the piece and performs basic recording operations in a tape recorder fashion. The Counter window shows where you are in a piece, the Metronome window sets the tempo, and the Tracks window lets you add, delete, or select a track to work with.



Desktop Tennis

Grand Slam Tennis

Sports simulation. Pros: *Realistic movement of players and shooting accuracy.* ***Cons:*** *Ineffective keyboard commands for certain shots.* ***List price:*** *$49.95.* ***Requires:*** *512K.* ***Copy protection:*** *Not copyable.*

Infinity Software's *Grand Slam Tennis* is a computerized tour of the four major tournaments in tennis: the French Open, Wimbledon, the United States Open, and the Australian Open. Court surfaces change depending on locale, ranging from Wimbledon's fast grass to the slow clay of Paris. The game's menu provides tactical information for each tournament, recommending racket types and string-tension settings as well as appropriate playing strategies. Menu choices also let you select weather conditions and playing speed.

The screen shows a standard tennis court with tournament trappings, including fans, a scoreboard, a functioning ball boy, and a line judge. Your player stands in the lower half of the screen and runs in the direction you move the mouse. Ball sounds and cheers from the crowd add realism. Scoring follows basic tennis rules, but you can use the practice option to play without keeping score. You compete against one of four opponents, each with a different playing style.

Serve and Volley

Press the space bar to toss the ball, then click the mouse to hit. If you serve from the correct position, the ball invariably lands inbounds. You'll soon find that unless your opponent is making ridiculous blunders—which he'll sometimes do in irrational clusters—most points are intensely contested. For instance Ace, the number-four seed, plays conservatively and stays on the baseline. But he draws you into hypnotic rallies and slowly maneuvers you into a corner.

By pressing a key and then clicking the mouse, you can smash, lob, add slice or topspin, or hit harder or softer. The Slice, Topspin, and Harder commands seem to have little effect on the ball and offer no tactical advantage. The Smash and Lob keys are more useful. Going to the net is always somewhat risky, even against a slow, predictable player like Ace, but once your opponent is at the net, the Smash key is the ticket.

Against a reckless player like Chiphead, you'll have ample opportunity to lob. In fact, shots of all kinds find their way over Chiphead's head, and he is prone to double-faulting on his serves. I consider Ace a more interesting opponent.

Demon and Warrior are swift and aggressive. Sharp reflexes and a firm command of the keyboard options are vital. Occasionally, however, they play completely out of character, an inconsistency that undermines the game's challenge.

Match Point

I found unrealistic the protracted inability of a top-seeded player to so much as hit the ball inbounds or return a single serve. And at times the game's mouse response is unpredictable, causing your player to rush uncontrollably around the court.

When your player is obedient, however, and the opposition is playing well, the long, artful rallies are a pleasure. Overall, *Grand Slam Tennis* is a clever and well-implemented game—an intriguing, if sometimes frustrating challenge.—*Richard Miller*

See *Where to Buy* for product details.

Not Just for T-Shirts

ColorPress 1.1

A color printing program. Pros: *Excellent user interface; prints better than* ColorPrint *on ImageWriter II, creates T-shirts and 3-D images.* ***Cons:*** *Does not work with ImageWriter II on AppleTalk.* ***List price:*** *$39.95.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

ColorPress, a color printing program from Diversions, prints multicolored *MacPaint* drawings on the ImageWriter, with a 512K Mac or a Macintosh Plus. Since the ImageWriter I supports only monochrome ribbons, *ColorPress* requires multiple passes and ribbon changes to produce colored images. The ImageWriter II, however, uses a four-color ribbon.

Packaged with *ColorPress* are files and instructions for printing 3-D images on T-shirts; Underware ribbons, which transfer ImageWriter printouts onto fabric; and special T-shirt fonts. The $39.95 *ColorPress* can produce color output for virtually any business chart that can be created by or pasted into *MacPaint,* including Clipboard or Scrapbook files created in *Microsoft Chart* or *Microsoft Excel.*

ColorPress requires a separate file for each color printed. A master outline of your drawing in *MacPaint* serves as the template for each of the other files. Neither the master nor the color files should include any fill patterns; you will add

these later in separate files In repeating this process for each color, make sure not to shift the location of the drawing on the page.

Creating *ColorPress* files from an existing *MacPaint* file is more difficult. Since all the details of the final drawing are already in the original, when you create the file for one color, you must erase the portions of the drawing that should be a different color. Erasing the fine detail of a digitized image for multiple colors can be very tedious.

To print the final drawing, *ColorPress* needs to know which files to use. It helps to include the color in the file names when you save each of the files that compose the drawing. *ColorPress* creates a new file which includes the separate files for the drawing and specifies which color goes with which file. To print further copies, simply print this new file. Printing options let you flip the drawing both vertically and horizontally and let you specify unidirectional or bidirectional printing and type of ribbon (see "Simultaneous Display"). The program takes approximately 5 minutes to print a typical drawing. Colors other than the standard yellow, red, blue, and black can be printed with the techniques described in "Coming Out in Color," *Macworld,* July 1986.

There are a few drawbacks to *ColorPress*. First, it does not use the standard Macintosh printer drivers and as a result does not support the ImageWriter II on the AppleTalk network. Although the user interface is very straightforward and adheres well to the Macintosh interface, it is visually elaborate to the point of being cute. The developer's time could have been better spent writing AppleTalk-compatible drivers.

Nevertheless, *ColorPress* is fun to use, comes with a clear, well-written manual, and is not copy protected. If you're looking for color output of bit-mapped graphics on the ImageWriter I or II, this program is worth considering. And if you have ever wanted to print your own T-shirts, this program is a must.—*Prasad Kaipa*

See *Where to Buy* for product details.

Play It Again, Sam(antha)

Alter Ego *1.0*

Role-playing game. ***Pros:*** *Game can be played many times with different outcomes.* ***Cons:*** *Male and female versions quite similar; the game's tone is that of a parlor game.* ***List price:*** *$59.95.* ***Requires:*** *128K.* ***Copy protection:*** *yes.*

If you've ever wished for another chance at life so that you could do things differently the second time around, then Activision's *Alter Ego* is just what you've been waiting for. Maybe. *Alter Ego* is described in the manual as a fantasy role-playing game. But instead of battling dragons and rescuing princesses, in *Alter Ego* you battle your way through a series of "real-life" experiences as you live a simulated life from infancy to old age.

Don't Just Be Yourself

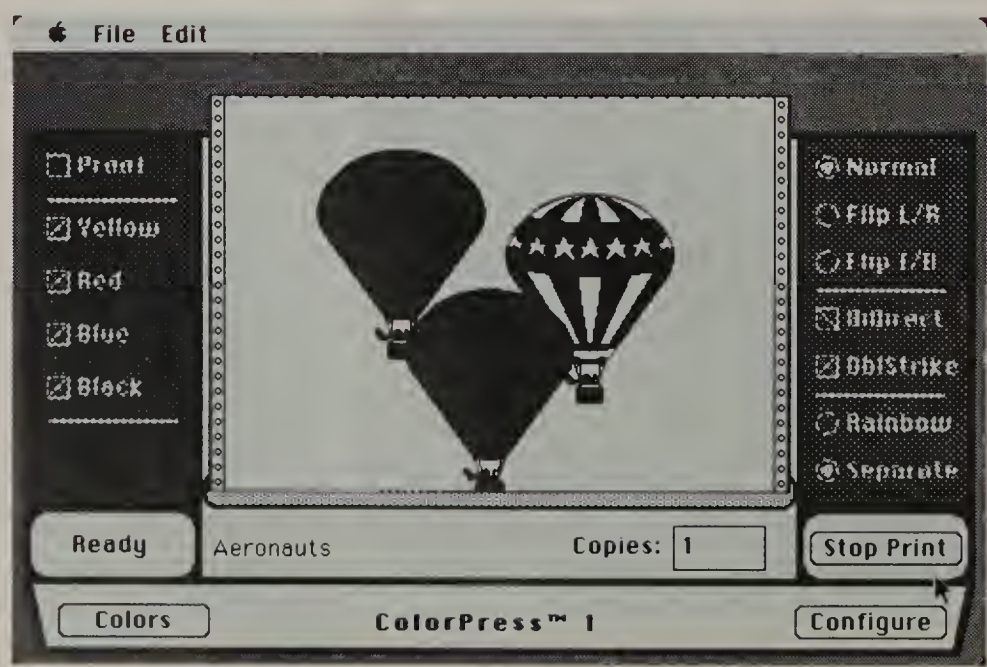
When you start a game, your first task is to respond to 25 simple true/false statements, such as "I am extremely sensitive to criticism," and "The people around me seem to be happier than me." Your answers form the basis of a personality profile that is continually developed and refined as you play. You can respond honestly, in accordance with your own personality, or you can create an alternate personality. In either case, by the time you finish the questionnaire, you will have ratings for such personality characteristics as happiness, trustworthiness, confidence, and intellectual and social development.

The next stage of the game presents a series of situations borrowed from real life and invites you to respond to them with your new personality. You can start off at any point in your alter ego's life cycle—infancy, childhood, adolescence, young adulthood, middle adulthood, or old age—although the author, psychologist Peter Favaro, recommends that you begin at infancy (actually, birth) and work through to old age.

I Click, Therefore I Am

You proceed by clicking on one of several icons, each of which opens to a life situation and a number of options. In the childhood stage, for example, you must deal with the first day of nursery school, the death of your goldfish, and other typical childhood experiences. During adolescence you go through the traumas of dating, the agony of peer pressure, and constant conflicts with your parents. Adulthood and old age bring increasing responsibilities. As in life, you are free to make whatever choices you want, but you have to accept the consequences. Certain options may not be available to you because of a conflict with your alter ego's personality. You might skip over entire life situations because of a missing element (such as a spouse or a family). Each time you make a choice, a comment from the narrator follows, sometimes offering words of wisdom, other times simply describing the consequences of your choice.

You choose icons from two basic categories: "life experience" icons, representing once-in-a-lifetime decisions, after which you go on to the next episode; and "life choice" icons, which you can access over and over. Life experiences are categorized as social, intellectual, emotional, physical, familial, and vocational. Examples of life choices are college, employment, marriage, risks, and major purchases. Whether you choose life experiences or life choices (a well-rounded life includes



Simultaneous Display
ColorPress *displays the file as it is being printed by the ImageWriter. You can control the print settings on screen.*

both), each decision affects your personality profile and your ultimate score in the game. You can look at your overall status (happiness, confidence, and so on) at any point in the game.

Is It Life?

Alter Ego purports to let you live through all the experiences that were unavailable to you in real life because of an excess of prudence, a lack of the necessary wherewithal, or simply the quirks of fate. However, be warned that the game doesn't let you live these experiences any more than reading *Gone with the Wind* lets you be Scarlett O'Hara. Reading about your own would-have-beens is about as gratifying as listening to a description of a friend's latest love affair; your involvement is never more than that of an observer.

During one game, I used *Alter Ego* to see what it would be like to live my life as a real creep. I laughed when my goldfish died; I callously refused to invite poor, fat Louise Feiback to my party; I finked on my friends, indulged in drugs, and was so unreliable that I even ruined my promising career as a fast-food cook. Unfortunately, I found the experience to be less than cathartic and only mildly amusing. My alter ego died at the age of 44, apparently of complications brought on by general dissolution and self-neglect. Unlike real life, *Alter Ego* gives you a second chance if you make a fatal mistake; you can press a button to resurrect yourself.

Alter Ego is available in two versions, male and female, although I could find little difference between the two. For example, in the male version a little boy nags his father to fix his bike, and a group of adolescent boys take parachute lessons. The corresponding episodes in the female version show a little girl nagging her mother to fix a doll and a group of teenage girls setting out to get a permanent eyebrow tattoo. Surely girls should be allowed to play with bicycles and parachutes without having to assume a male alter ego, but at least *Alter Ego* acknowledges the existence of female players, unlike many role-playing games.

On the whole, I'd rate *Alter Ego* as an interesting novelty. It's certainly a new type of Macintosh game. If you're the curious type, you can play *Alter Ego* several times, creating a different persona each time and achieving different results. But I think I'll do my fantasizing in my head, thanks.
–Dolores Hayes

See *Where to Buy* for product details.

FRED STIMSON

20 Megabytes with a Safety Net

AST-2000

20-megabyte disk with tape. Pros: *SCSI interface; does quick and easy whole-disk backup on built-in tape.* ***Cons:*** *Expensive; tape disk feature slow and unreliable.* ***List price:*** *$2795.* ***Requires:*** *512K.*

The AST-2000 is distinguished from the other Macintosh hard disk SCSI drives by AST Research's reputation for building reliable hardware and by the availability of a built-in tape drive for fast disk backup. The tape drive can also be used as a disk drive, albeit a slow one, in the Finder and other applications.

I tested the AST-2000 model that contains a 20MB disk drive and a 20MB tape drive. Other models have a 20MB disk drive alone, a 20MB tape drive alone, or two 20MB disk drives. Actual formatted capacity varies; the disk and tape in the tested unit had 20,471 bytes each.

All models use a 4- by 13½- by 9½-inch cabinet—a bit large to be carried around in a Mac bag. The AST-2000 attaches to a Mac Plus SCSI port with a three-piece cable that's provided. It does not work with a Mac 512K unless the Mac has a SCSI port adapter installed. The drive works on 120 or 230 volts, 50 or 60 hertz. The cooling fan is moderately noisy, and the tape drive makes a lot of intermittent noise.

The AST-2000 drive operated at about the same speed as other SCSI drives and

was generally reliable during the ten-day test period. Only one problem came up. After inserting a tape and daisy-chaining another SCSI drive to the Mac, I had trouble starting *MacDraw* and *MicroPhone,* two of the 26 programs I tried. Until AST and Software Ventures solve the problem, you'll have to eject the tape before using either program with another SCSI drive attached.

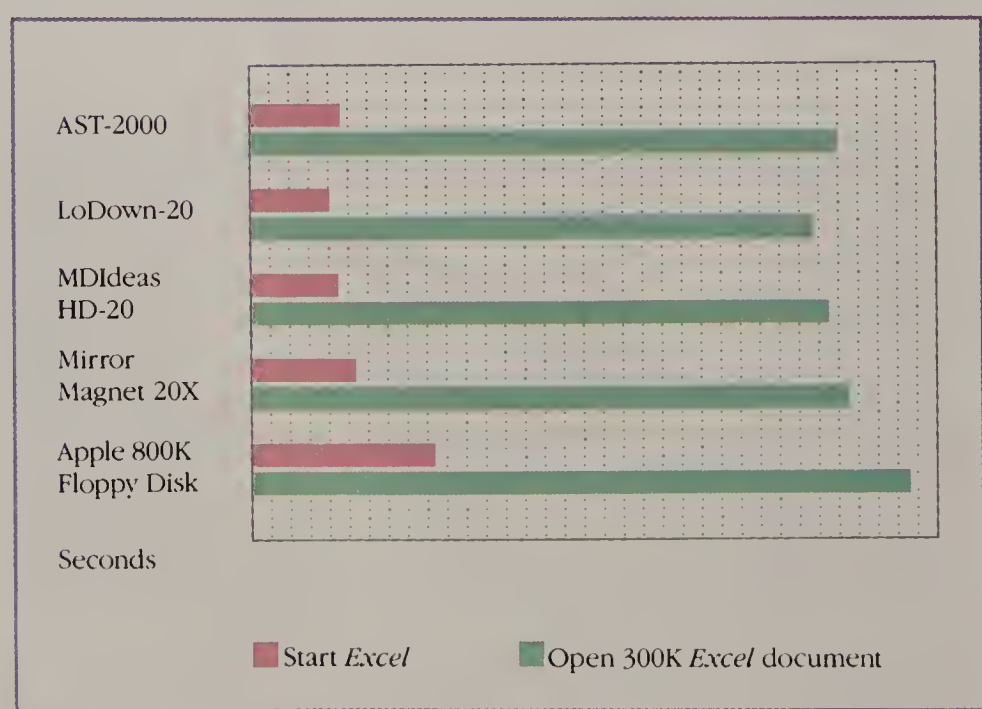
When used as a disk backup device, the AST-2000 tape drive is fairly efficient. AST's backup program copied an entire disk onto a tape in 11 minutes and restored it from tape in 13 minutes. The backup program copies the entire disk image. To copy selected files and folders, you must laboriously use the Finder. The built-in tape can back up other AST-2000 disks connected to the same Macintosh, but not those of other manufacturers.

The tape is too slow to be used often as a disk. The tape icon takes up to 5 minutes to appear in the Finder, depending on how much is on the tape; once it appears, manipulating its files and folders is tedious. The tape disk even bogs down Open and Save dialog boxes when you cycle past it using the Drive button. Fortunately, you can eject the tape, inserting it only for disk backup.

Discounting problems with its relatively unimportant tape-disk feature, the AST-2000 is a solid performer. The model with a built-in tape drive should appeal especially to Mac users who want the speed and convenience of a SCSI hard disk drive and are willing to pay extra for an effective safety net.—*Lon Poole*

See *Where to Buy* for product details.

SCSI Performance
The AST-2000 disk drive starts Excel *and opens a 300K* Excel *worksheet about as quickly as most other SCSI disks, which are all faster than a floppy disk or the AST tape disk.*



I Only Have Files for Glue

Glue 1.04

File transfer utility. Pros: *Allows users to view or print files without entering the application in which the files were created; supports laser printing options.* ***Cons:*** *None.* ***List price:*** *$49.* ***Requires:*** *128K.* ***Copy protection:*** *None.*

Up to now, if you sent someone an *Excel* file via modem, that person had to open it with *Excel.* Today, a clever new application called *Glue* takes "snapshots" of documents created in a variety of programs and allows you to display or print the snapshots using nothing but *Glue* itself.

This means you can produce a spreadsheet with *Excel* or a newsletter with *PageMaker* and send it by modem across the country. The recipient can open the file with a copy of *Glue,* print it on the LaserWriter, peruse the document, and phone you with comments the same day.

Glue also provides an easy way to capture graphics from applications like *MacDraw, Jazz,* or *Excel* and paste them into others, including page-layout programs like *PageMaker. Glue* captures graphics as large as a full page. One of *Glue*'s most impressive features is its ability to store QuickDraw commands, allowing you to take advantage of laser fonts and smoothing when printing a document.

Glue Anatomy

The *Glue* disk contains two subprograms: ImageSaver and the Viewer. ImageSaver, a desk accessory, records a document or a portion of a document on disk and can be easily installed on a hard disk or in an application's System Folder. It takes up a paltry 10K of disk space.

Saving an image to disk is straightforward. If you're working in an application and want to save a file with *Glue,* select Chooser from the Apple menu. When the Chooser dialog box appears, click the ImageSaver camera icon and then choose Page Setup from the File menu. Select Portrait or Landscape orientation, click OK, and choose Print from the File menu. ImageSaver then asks you to name the file and "prints" it to disk. When you return to the desktop, the file appears as a *Glue* document icon, which makes sense in conjunction with *Glue*'s third icon, the Viewer. This icon takes up 40K and installs on either a hard disk or a floppy. The Viewer displays *Glue* documents, prints them on the ImageWriter or LaserWriter, or copies them to other applications via the Clipboard or Scrapbook. The Viewer works directly

with *MacPaint* or *FullPaint* documents, so you needn't save them with ImageSaver. The Viewer also saves documents from other applications in *MacPaint* or *FullPaint* format, for touch-up with one of those programs.

When you open a document with the Viewer, scroll bars allow you to move around the page. In multipage documents, dotted lines separate the pages on the screen. You can copy a portion of the document with a selection rectangle similar to that of *FullPaint* or *MacPaint,* or you can select an entire page. Choose Copy to transfer the image to the Clipboard.

Is Glue for You?

I tried *Glue* with several programs—*MacWrite, MacDraw, Excel, Chart, PageMaker*—and encountered no problems. The manual gives clear instructions for beginners and provides a quick-reference section for experienced users.

Glue is a good program: it's inexpensive, it's not copy protected, and it works. If you often need to transfer information by modem or copy graphics between programs, you should seriously consider *Glue.—Erfert Nielson*

See *Where to Buy* for product details.

Try to Remember

Smart Alarms *1.4*
Appointment Diary *2.2*

Personal reminder and time management desk accessories. Pros: *The two accessories are integrated, allowing you to convert calendar entries to reminders; both accessories are fast and flexible.* ***Cons:*** *Can cause system crashes if other large desk accessories are installed.* ***List price:*** *$49.95.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

I've drawn a blank more than once when the Mac beeps at me and blinks the Apple in the menu bar. A practical solution to this problem is Imagine Software's *Smart Alarms*—a desk accessory that interrupts what you're doing to display a dialog box with a reminder. The message in the box is one you've written, and it can be up to 96 characters. Procrastination is as easy as clicking the mouse if you can't deal with a reminder immediately. *Smart Alarms* is accompanied by *Appointment Diary*—a multiyear calendar with ten diary pages available a day. *Appointment Diary* is integrated with *Smart Alarms,* so appointments can be converted to reminders.

Smart Alarms

To create one of the 1600 reminders *Smart Alarms* lets you store, you fill out a simple form. You can request advance warning for a special event, and for a recurring event you can also select the appropriate interval.

When a reminder is due, the Mac beeps a few times and a dialog box containing your message appears (see "Don't Forget"). You can send the reminder away by clicking OK, or by pressing either Return or Enter. The reminder will return in 5 minutes (an option lets you change the interval to 15 minutes, half an hour, an hour, or 24 hours). If you want to deal with the reminder immediately, discard it by clicking a button. If you don't respond within a minute, the Mac emits louder beeps, which continue at one-minute intervals until someone pays attention.

If the Mac is off when a reminder is due, the reminder will be displayed as soon as the Mac is turned on if *Smart Alarms* is installed on the start-up disk. However, now you need never turn off your Mac. Imagine Software has included the desk accessory *Sleep* on the *Smart Alarms* disk. *Sleep* blanks the screen when the Mac is idle to prevent image burn-in. When *Sleep* is selected and a reminder comes due, *Smart Alarms* wakes up the Mac and activates the reminder.

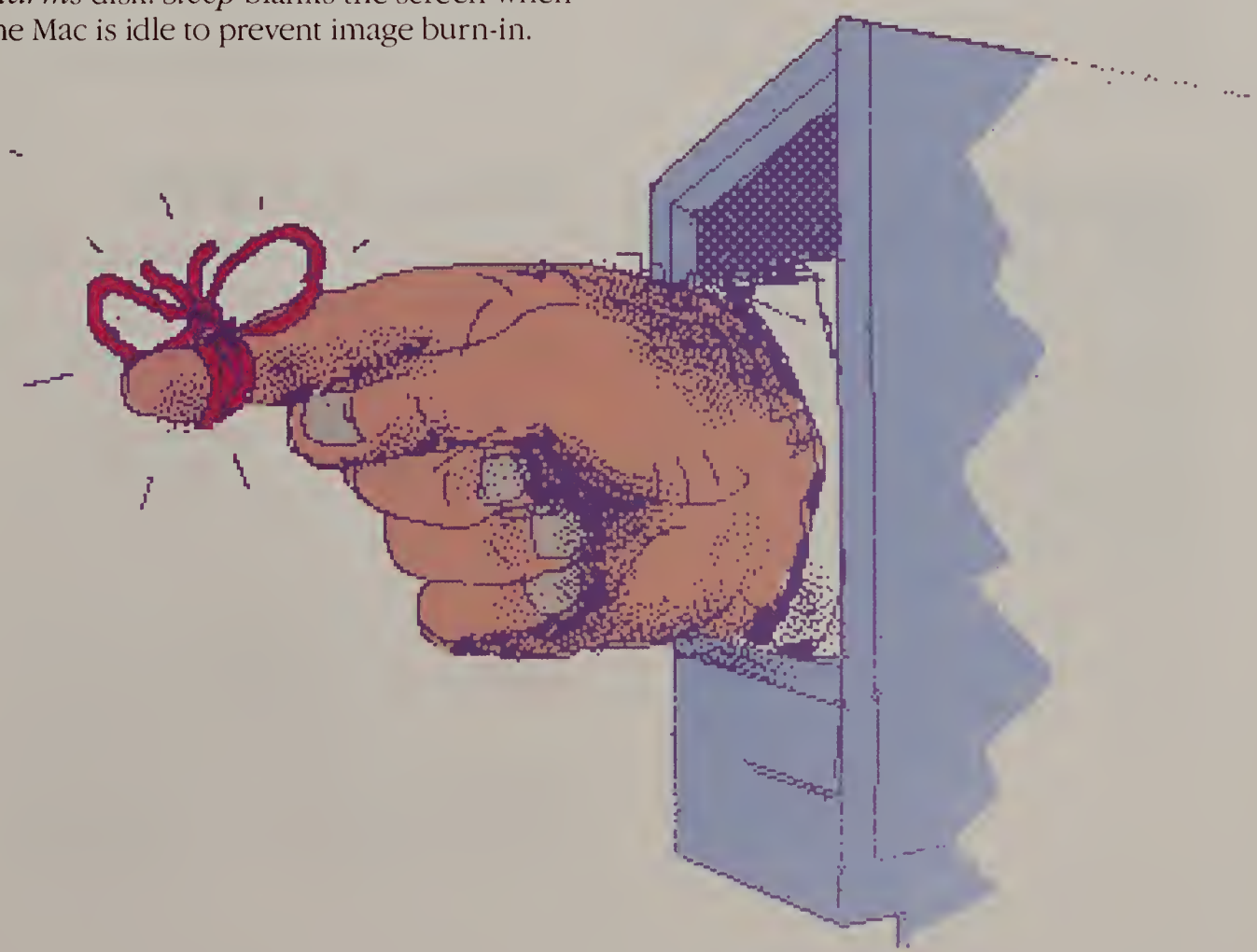
Smart Alarms is smart enough not to obstruct important operations, such as data transfer by modem. Once the data exchange is complete, *Smart Alarms* will display your reminder.

Appointment Diary

Appointment Diary has two parts: a calendar and a diary. The calendar displays two months at a time; dates with associated diary entries are boldfaced. When the calendar is first opened, the current date is selected for diary entry. The program moves quickly between dates, even as information accumulates. The largest allowable entries—32,000 characters—take about 10 seconds to open.

Special features are accessible from the Diary menu. You might want hourly divisions on each page of your diary. Design the layout you have in mind, then select Auto Layout. The custom layout automatically appears on any empty pages, but existing entries are not affected.

The Find option lets you search your diary for a particular word or phrase. Set Reminder converts text in the diary to a *Smart Alarms* reminder. This command opens the *Smart Alarms* Reminder screen, where you set the date, time, and other *Smart Alarms* parameters.



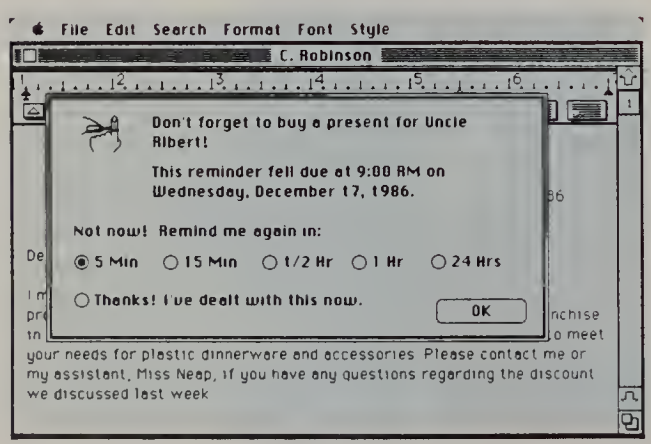
I like *Appointment Diary*'s design: clean lines, no clutter, very functional. I had always put calendar programs in the class of if-it-isn't-broken-don't-fix-it software—programs designed to replace manual systems that function quite well. But *Appointment Diary* changed my mind.

Installation and Considerations

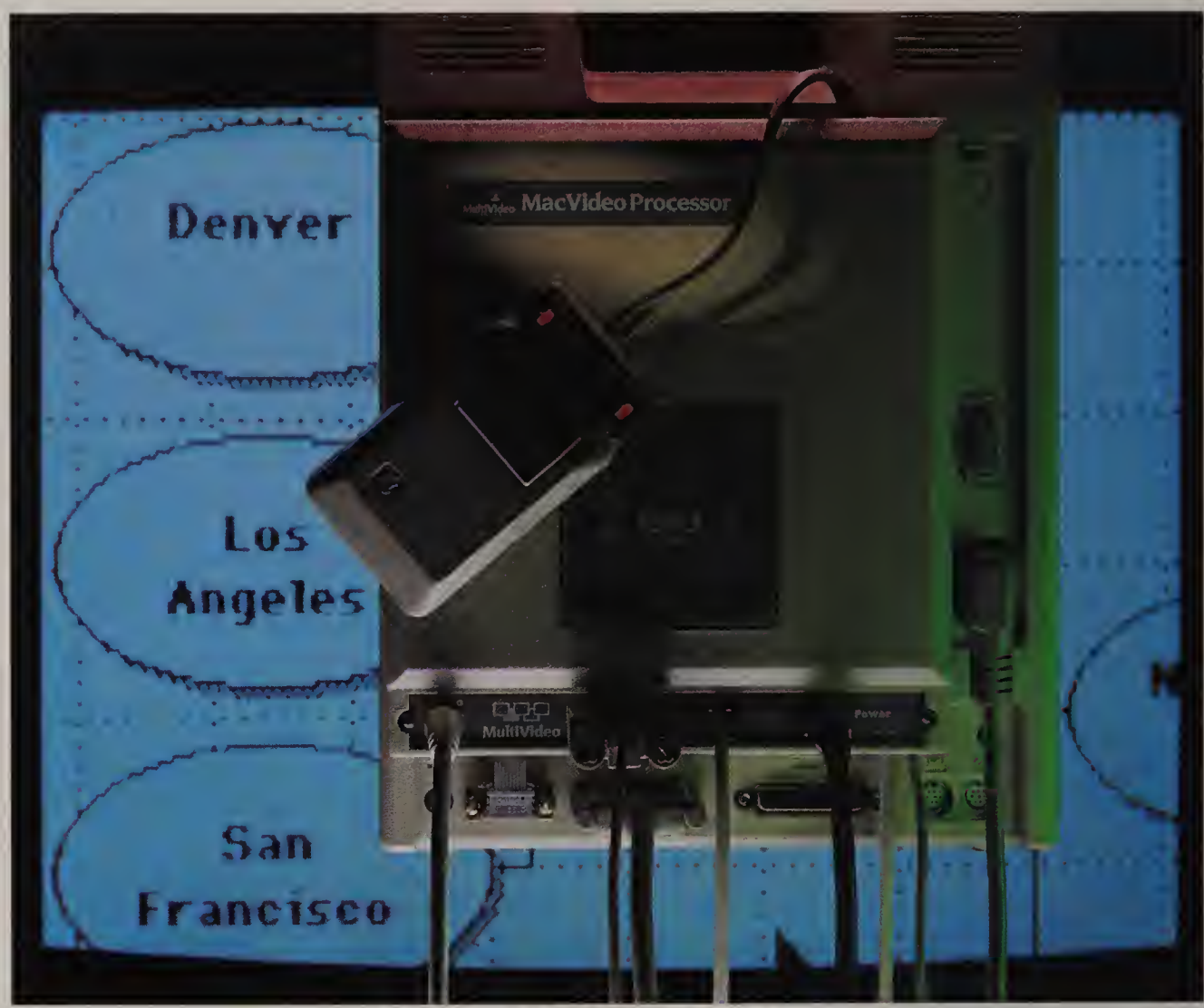
Installation of both accessories is straightforward. *Smart Alarms* has its own installation program, while *Appointment Diary* is installed by using Apple's Font/DA Mover. An enhanced Font/DA Mover is included.

Smart Alarms and *Appointment Diary* are both large desk accessories—10,224 and 17,642 bytes, respectively, compared to 4008 bytes for Apple's Alarm Clock and 2444 for the Calculator. Such large accessories use a lot of space in the system heap and may cause crashes on 512K Macs with RAM-based HFS. You'll need either a ROM upgrade or a program that enlarges the system heap, such as Infosphere's *MacServe*. The company will soon release a new version that corrects the problem. Newer Macs (512K Macs with ROM-based HFS and the Mac Plus) are relatively immune from this problem. In either case, save your work often.

Smart Alarms and *Appointment Diary* are compatible with the basic set of Apple desk accessories. If you're using other desk accessories, you should examine them before installing *Smart Alarms* and *Appointment Diary*. *Smart Alarms* and *Appointment Diary* are not compatible with Affinity MicroSystems' *Tempo*.



Don't Forget
Smart Alarms *displays reminders while you're working in any application in which the desk accessory is installed.*



MEL LINDSTROM

Smart Alarms is the best program of its type I've seen: flexible and fast. Although there are competing programs, these two stand out because they're powerful, carefully designed, and easy to use.—*Nanci Hamilton Reel*

See *Where to Buy* for product details.

What's on TV?

MacVideo Processor

Interface to TVs and VCRs. Pros: *Uses a conventional television or projection TV; clear instructions permit user installation.* ***Cons:*** *Screen details can't be seen clearly without magnification; some flicker.* ***List price:*** *$1295.* ***Requires:*** *128K.*

Besides making the usual complaints about being unable to view a full 8½- by 11-inch page, many gripe that the Mac's screen is too small for presentations or group training sessions. A handful of add-ons enable you to connect the Mac to large screens, but you must connect the Mac to a costly monitor or projection TV that accepts RS-170A signals, the standard video output for computers.

But now the MacVideo Processor (MVP), a real-time image processor from MultiVideo, converts the Mac's video output to NTSC video, the standard used by all TV sets and VCRs in North America and Japan. The MVP lets you display Mac programs on all TVs, and with a VCR, you can tape presentations for playback on any TV.

The MVP is different from other video output products in that it provides a great deal of control. For example, you can zoom in on any portion of the screen display, pan to view close-ups of different parts of the screen, and even freeze the picture while you command the Macintosh to do something else.

The $995 processor requires no special software to run but does use a separate power supply, which plugs into a wall socket. The MVP's video-out connector is the RCA phono type, so you can link the processor to a television or VCR with standard video cables.

Installation

Because the MVP makes an electrical connection inside the Mac, you must take the computer apart to install it. Keep in mind that removing the Mac's rear cover exposes lethal voltages, even when it's off, so professional assistance may be called for.

Installation is fairly easy, and all the necessary tools and instructions are provided. The adapter board occupies the same space used by some internal hard disks, so if you have a HyperDrive or Micah AT drive installed, check with MultiVideo on compatibility.

The MVP's output is standard NTSC composite video, so you can attach the processor directly to any VCR, TV, or monitor that has a composite video input jack. If your TV has VHF and UHF antenna terminals only, you'll need an RF adapter (available at Radio Shack). RF adapters degrade picture quality, so use direct video inputs whenever possible.

Panning and Zooming

When using the MVP, you see the entire Mac display on the TV screen, except for a 5- or 10-pixel border around the edge of the screen. You can pan back and forth to see the edges using the MVP's control switches, which attach to the mouse. Push the switch on the right, and the image on the monitor pans in the direction you move the mouse. When you pan the screen, the Mac's arrow pointer freezes. Push the right-hand switch again to regain control of the Mac.

The right-hand switch also operates the zoom function. Because the Mac's 512- by 342-pixel screen is compressed to no more than 220 by 330 pixels on a TV or monitor, details are impossible to see at normal size. The loss of picture definition means that fonts smaller than about 14-point can't be read. In addition, only large graphic elements can be recognized; desktop icons are fuzzy and difficult to discern. With the right-hand switch activated, press the mouse button to zoom in on the screen image. Each click increases the magnification: from 1.5× to 4× to 16×. At 16× magnification, even the smallest fonts and graphics are easy to see.

The control switch on the left freezes the current image, allowing you to operate the Macintosh as usual. The monitor continues to display the image while you're operating the Mac.

I encountered one problem: images that display with no problem on the Mac's screen may flicker when shown on a TV, especially images composed of fine horizontal lines. Reduce the flicker by turning down the contrast on the TV.

The MacVideo Processor offers sufficient resolution for most presentation and training purposes, but you may want a sharper picture. An RGB version of MVP lets you connect the processor to a more expensive digital (TTL) RGB monitor.

Overall, I was impressed by the flexibility and features of the MacVideo Processor. Its $995 price tag is reasonable, considering its effectiveness in displaying the Mac screen to a large audience.—*Gordon McComb*

See *Where to Buy* for product details.

LISP in a Shoe Box

***MacScheme** 1.11*

***LISP programming language. Pros:** An intelligent editor, debugger, and built-in assembler; comes with a tutorial manual; good balance between size and speed; upgrades available; useful for learning LISP and AI programming. **Cons:** Needs 2 megabytes of RAM for any serious work; not appropriate for most commercial software development; rudimentary sound and graphics; requires some knowledge of LISP. **List price:** Version 1.2 $125. **Requires:** 512K. **Copy protection:** None.*

Scheme is an extremely compact dialect of LISP that fits much more easily within the confines of microcomputers such as the Macintosh. MacScheme by Semantic Microsystems is a complete implementation of Scheme.

A Little Assist

Working with MacScheme is a pleasant experience. As you enter a program, the system editor automatically indents lines, keeping track of the nesting within the program. When you close an expression with a right parenthesis, the corresponding left parenthesis flashes a couple of times, letting you know which expression you're terminating.

When working with MacScheme, you can very easily make simple typographical errors. Since almost all errors force you into the debug mode, the "q" command (for "quit") becomes disproportionately important. Considering the likelihood of making errors, the several seconds the debug messages take to appear on the screen can be annoying. A useful feature of the debugger is its ability to trace the execution of your program; for this purpose, a copy of the source code stays in RAM. If you need the extra space, however, you can disable this feature with a software switch.

Certain errors bypass the debugger and simply cause MacScheme to reset. You don't lose your program, but you can't go back to find out what caused the failure. For example, MacScheme does not trap major system errors, such as a Macintosh heap overflow, which cause the system to fail and display the "bomb" message.

Another drawback is that version 1.11 lacks a utility for printing your programs or sending program output to the printer. So until the printer function is included with the next version, you'll have to use *MacWrite* to print out MacScheme source programs.

A Well-Balanced Performer

MacScheme is intended as an accompaniment to existing language texts for those learning LISP programming or for those interested in AI research who don't have access to the more expensive and cumbersome systems available on mainframes and minicomputers.

MacScheme is a compiling interpreter similar to UCSD Pascal. Programs are compiled to byte-code—similar to p-code—which is then executed by an interpreter. In benchmark tests, MacScheme's execution time falls between the high-speed native code compiler and the slower conventional interpreter (see "Benchmark Results"). Like BASIC or FORTH, it is an interactive language. Thus, you can build a

Benchmark Results

Test	ExperLisp 1.04	MacScheme 1.11	XLisp
tak	350	680	650
takl	970	251	5660
deriv	139	225	1150
dderiv	304	268	5850

program as a series of small pieces and test each one independently.

Although MacScheme will run on a 512K Macintosh, it's still a tight fit, with the nucleus taking up about 75K of memory. The "stop-and-copy" garbage-collection method used to recover unused data space on the Scheme heap requires two copies of the heap, leaving only 160K for user programs. For any serious work, a 2MB Mac Plus, providing 900K of memory, is necessary.

MacScheme is a well-executed LISP programming system overall. Simple to learn and easy to use, it includes useful features such as an intelligent indenting editor, a debugger, and a built-in assembler. The tutorial manual provides adequate information for a programmer who has some knowledge of LISP. Its byte-code compiler successfully balances size against speed. Semantic Microsystems is continuously upgrading its product, so the flaws in version 1.11 should be corrected in the next release. MacScheme would probably not be appropriate as a system for developing commercial programs—graphics, sound, and other desirable features are rudimentary. But for AI work, it is certainly LISP in a shoe box.—*Ken Takara*

See *Where to Buy* for product details.

The Compact Spreadsheet

***MacCalc** 1.0*

***Full-function spreadsheet. Pros:** Easy to use, powerful, and fast; reads WKS and SYLK files. **Cons:** No macros; only one file can be open at one time; no linking between spreadsheets; no graphics. **List price:** $99.95. **Requires:** 512K. **Copy protection:** None.*

Bravo Technology's *MacCalc* is a full-featured spreadsheet program with a good user interface and on-line help (the company also provides excellent telephone support). *MacCalc* offers more flexibility in page and font setup than *Microsoft Multiplan* or *Microsoft Excel* and has more printing options.

Although the manual includes no tutorial section, you can learn the program quickly if you are already familiar with either *Multiplan* or Lotus's *1-2-3*. You can transfer data from other spreadsheets to *MacCalc* via the SYLK file format (from *Multiplan* and *Excel*) and with the WKS format (*1-2-3* and *Jazz*). You can also export data from *MacCalc* to other worksheets. However, SYLK files do not transfer formulas or cell formats.

Theoretically, *MacCalc* builds worksheets of 125 columns and 999 rows, but that size is not practical on a 512K Macintosh. The special routines in *MacCalc* make operations such as entering data and recalculating, opening files, and scrolling about 10 to 15 percent faster than *Excel*. Unlike *Multiplan* or *Excel*, *MacCalc* offers extensive formatting, allowing you to mix font sizes and styles in each cell or range of cells.

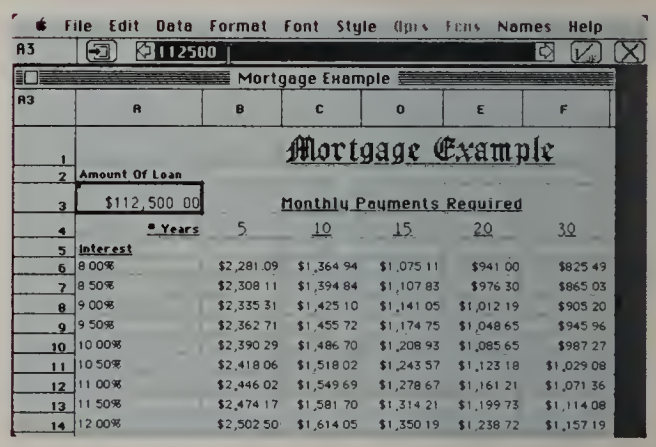
At Your Command

Writing formulas in *MacCalc* is easier than in *Excel*, since the functions are immediately accessible from the menu rather than a dialog box. You can use any of 15 operators available in the OPRS menu, and the list includes logical and most mathematical operators. The Function menu contains 58 functions for scientific, engineering, business, and real estate calculations. Although you cannot perform time calculations (date calculations can be performed beginning from 1940), you can incorporate date and time in the headers and footers.

MacCalc provides an annotation feature with which you can attach a comments file (up to 256 characters) to any cell for future reference. *MacCalc*'s scrolling menu uses arrows to show scrolling direction and to indicate any hidden items. You can limit the size of the spreadsheet to the rows and columns you actually use, and the scroll bars adjust to that size. A small window displays row and column numbers as you scroll by.

An unusual feature is *MacCalc*'s ability to increase row height in addition to column width. You can highlight a figure or heading by varying the font size; type; and style, such as bold, underlined, or italicized (see "For Presentation"). This lets you print a formatted report without having to copy and paste the data into a word processing document to add different font sizes and styles for the column headings. Printing features include font choices for headers and footers.

MacCalc has some limited database functions, with a search feature that is more powerful than *Excel*'s. You can search for both numbers and text either in the complete worksheet or in a designated range. You can also look for numbers (or text) greater or less than the specified number (or text). Both cell and document protection are available.



For Presentation

MacCalc *lets you vary font sizes and types for printing presentation-quality reports directly from your spreadsheet.*

What's Missing?

The program's major limitation is the current version's inability to link worksheets and compare multiple spreadsheets simultaneously. You also have a limited view of the formula cell. This can be a problem when you're entering or proofing the formula. Data entry is also delayed because you cannot select functions with a key command from the menu bar. And, unlike *Excel, MacCalc* requires you to press the ⌘ key while selecting the range in order to duplicate cells and formulas.

MacCalc has no macro language, and array manipulation is not possible, nor does the program offer graphics to chart your data. However, *MacCalc* works well with the *Switcher,* which means you can display your data graphically with Cricket Software's *Cricket Graph,* Microsoft's *Chart,* or CE Software's *MockChart.*

MacCalc is a well-designed and powerful product for those who require a full-featured spreadsheet program but do not need a large spreadsheet with macros, array manipulation, and graphics. It is easy to learn, fast, and efficient and is a very good buy at $99.—*Prasad Kaipa and Keith Matthews*

See *Where to Buy* for product details.

```
'Draw a rectangle and wait until mouse button is pressed
'Then display message saying where pointer was

'© 1985 Clear Lake Research Incorporated

LIBRARY "ToolLib"
DIM rect%(3), pt%(1)
in$="It's in the rectangle"
out$="It's not in the rectangle"
inRect%=0                                  'initialize inRect%
SetRect rect%(0),50,60,100,80              'define the rectangle
FRAMERECT VARPTR(rect%(0))                 'frame the rectangle
WHILE MOUSE(0)=0: WEND                     'wait for a mouse down
pt%(0)=MOUSE(4)                            'get the point
pt%(1)=MOUSE(3)
ptInRect pt%(0),rect%(0),inRect%           'set inRect%
MOVETO 10,10
IF inRect% THEN PRINT in$ ELSE PRINT out$
END
```

CLR Library Example
This BASIC program uses the CLR statements setRect and ptInRect.

Hot Rod BASIC

CLR ToolLib, CLR MathStatLib, CLR SpeechLib

Microsoft BASIC 2.0 or 2.1 extender. Pros: *Powerful, comprehensive, and easy to use; involves some advanced programming concepts.* ***Cons:*** *Requires 5K to 40K of extra disk space on BASIC disk.* ***List price:*** *CLR MathStatLib, CLR SpeechLib $35 each; CLR ToolLib no longer sold separately (will be included in Microsoft BASIC).* ***Requires:*** *128K.* ***Copy protection:*** *None.*

Microsoft BASIC versions 2.0 and 2.1 can be extended with machine language modules that take the form of CODE type resources. The three CLR libraries—*ToolLib, MathStatLib,* and *SpeechLib*—add over 180 statements to Microsoft BASIC's repertoire.

Standard Microsoft BASIC statements provide access to many of the Mac's Toolbox ROM routines, but several important features are missing. The *ToolLib* library provides access to many missing graphics, resources, and text-scrolling features. *ToolLib* statements create and manipulate points, rectangles, Booleans, polygons, regions, mapping, clipping, pictures, and text. Other statements let a BASIC program use and modify alert, pointer, icon, array, pattern, picture, and string resources. *ToolLib* also has statements that vertically scroll boxed text. Selecting scrollable text is limited, however, to one whole text line at a time. Thus, *ToolLib* statements can set up a scrollable list and let you choose from it, as in an Open dialog box, but they cannot implement full-fledged text editing or scroll graphics.

MathStatLib is not just for mathematicians and statisticians. It includes statements for sorting all types of numeric arrays and string arrays. The statements can sort an index array for tracking of the original sequence or for using several arrays in the same sequence as the sorted one. Other statements perform matrix operations; *MathStatLib* statistical statements find the maximum, mean, mean and standard deviation, minimum, sum, and t-test of an array. Other statements calculate cumulative chi-square, F, t, and standard normal probability distributions.

Apple's *Macintalk* software makes the Mac talk, and CLR's *SpeechLib* library brings this capability to Microsoft BASIC programs. *SpeechLib* statements convert English phrases to *Macintalk* phonemes, speak phonemic phrases, and adjust pitch and rate of speech. The *SpeechLib* disk, which includes *Macintalk* and Apple's *Exception Edit* program, lets you create dictionaries of phonemic spellings.

To use the CLR libraries, you drag the appropriate library icons onto your BASIC disk and add LIBRARY statements to the beginning of your BASIC programs. The CLR statements themselves are actually shortened CALL statements, so they are a bit different from regular BASIC statements (see "CLR Library Example"). Also, programs that use CLR statements can be somewhat confusing to read, since shortened CALL statements are not displayed in boldface like regular BASIC keywords.

A utility program named StatementMover is included with *ToolLib* and *MathStatLib* for creating small customized libraries that contain only the statements needed for a particular BASIC program. Smaller libraries use less memory and are set up more quickly when the BASIC program is started. Another utility program, ScrapbookMover, lets you move pictures from the Scrapbook to any resource file, where your BASIC program can get at them. Both utilities work like Apple's Font/DA Mover program, so they're easy to use. And since they're written in BASIC using CLR statements, they do double duty as examples of CLR library use.

Although I could not try them all, the CLR statements I did check seemed to work properly and quickly with the Mac Plus's 128K ROM and the original 64K ROM. In particular, I did not check the *MathStatLib* statements' accuracy. The

Statement Mover and Scrapbook Mover utilities had trouble finding files on an HFS disk until I ran *HFS Open,* a public domain program that's available from most user groups.

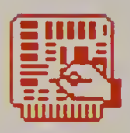
The *MathStatLib* and *SpeechLib* libraries are suitable for BASIC programmers at any level, but the *ToolLib* library is probably not appropriate for beginners. Many *ToolLib* statements require careful programming and some knowledge of advanced topics. Intermediate and advanced BASIC programmers should have no trouble understanding the descriptions of advanced topics in the concise CLR manuals. It's hard to imagine a Microsoft BASIC programmer who wouldn't benefit from the CLR libraries.—*Lon Poole*

See *Where to Buy* for product details.

The Printed Circuit

Quik Circuit 3.0

PC board layout software. Pros: *Easy to learn and use; straightforward manual; upgrades distributed on a regular basis; company has network of CAM dealers.* ***Cons:*** *Lacks a simple pin-to-pin autorouter.* ***Requires:*** *512K.* ***List price:*** *$695.* ***Copy protection:*** *None.*



Quik Circuit, a software package distributed by Bishop Graphics for laying out printed circuit boards (PCBs), is an easy-to-use program offering a choice of board outlines, grid spacing, zoom levels, trace widths, and pad sizes. Board outlines for DEC, Apple II, and IBM PC micros can be called up and used immediately. If you need an odd-sized board, you can design one, add the card edge connectors, and save the outline for future use.

The Layout

The program handles multiple layers (two at a time) on layouts of up to 32 by 32 inches. When you're looking at the screen, one layer appears black and the other light gray. Filled-in ground planes and power-bus layers can be generated in addition to the usual component and solder-side images. Text and graphics can be combined to produce complete silk-screen masters, and a separate solder-mask layer is also supported.

The Set Grid feature allows grid spacings from .001 to 1.000 inch, and traces, pads, or vias that are added to the design snap at the nearest grid intersection. Several pad sizes and types are available. Since trace widths range from .001 to .255 inch, multiple traces easily pass between pads on .100-inch centers. The program contains a small library of layout elements, including IC patterns, TO cans, connectors, and preset pads for discrete components. These elements can be used with either analog or digital circuit layouts.

Quik Circuit allows custom design of new layout parts for special applications. For example, generating the new pads for surface-mounted components is no more trouble than changing the hole size through a via. With the Group and Store functions, you can create small libraries of pad arrays or wiring patterns for repeated use in a design (see "Pad Placement on Circuit Board"). This facilitates PCB layout and memory array routing.

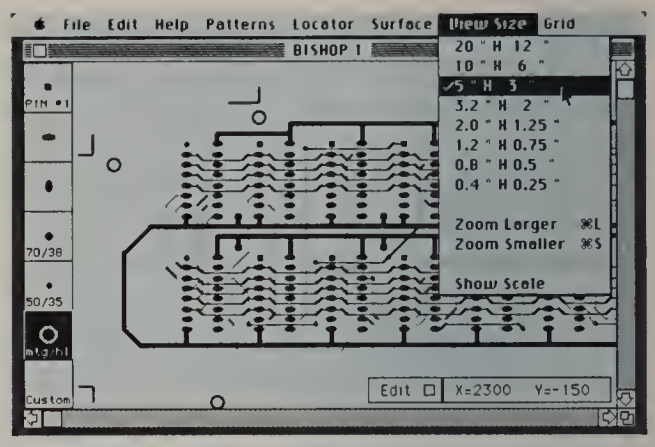
You can actually sketch a layout on the screen and produce a check print from it. When everything is the way you want it, you can make a 1×, 2×, or 4× plot or send your disk to a service company for Gerber photoplotting.

From Design to Finished Boards

You can use an ImageWriter to produce fast printout and either a Roland DG DXY-880 or DG DXY-980 (for ANSI B-size plots) or a Houston Instrument DMP 41 or DMP 51 for pen plotting at ANSI C- or D-size, or the DMP for E-size. A special serial cable ($35) is needed for DMP-series plotters. The Roland plotter uses a standard Apple printer cable. *Quik Circuit* also supports five Hewlett-Packard plotters with a driver that costs $150.

Photoplots have extremely high accuracy because a moving point of light generates the full-size layout artwork. To achieve comparable accuracy, you can specify pen plots that are larger than the actual circuit board and reduce the artwork photographically to produce a full-size image. For an additional $150, Gerber format software is available from Bishop for those who choose to use its CAM Network photoplotting services.

Bishop Graphics hosts a network of PC board fabricators who will work from your plots (or from Gerber photoplots) to produce finished boards from your de-



Pad Placement on Circuit Board
Note that the View Size pull-down is set to 5 by 3 inches and the leftmost menu shows the various available pad sizes. For accurate pad placement, you would normally use a much larger zoom.

signs. Several of these CAM Network service companies will work directly from your disk or from data sent over a modem and will send back finished circuit boards.

There's no sense comparing *Quik Circuit* to end-to-end electronic design programs like *P-CAD Systems, Futurenet,* or *EE Designer.* Programs that include circuit design, logic simulation, parts listings, and autoplacement use net lists to connect these functions to the layout process. *Quik Circuit* is a good low-cost layout program—no net lists, no rubber-banding of traces, no extensive libraries, nothing fancy—just a good layout program.—*Richard A. McGrath*

See *Where to Buy* for product details.

Winter Sports, Anyone?

Winter Games *1.0*

Sports simulation. Pros: *Excellent Mac graphics.* ***Cons:*** *Too easily mastered; more challenging with other performers.* ***List price:*** *$39.95.* ***Requires:*** *128K.* ***Copy protection:*** *yes.*

Have you ever dreamed about being an Olympic champion, standing on the dais listening to your national anthem, with a medal around your neck? You can realize that dream in *Winter Games,* from Epyx.

The game begins with an animated torch-lighting ceremony, complete with the familiar Olympics theme music and flights

of doves. Thankfully, you can choose not to attend by clicking the mouse and moving directly to the sports arena to practice your events. Choose from hotdog aerials, the biathlon, figure or free skating, the ski jump, or bobsled racing. Each event is accompanied by excellent sound effects and graphics.

Let the Games Begin

Once you and your opponents have finished practicing, you each select the country you want to represent, then start the competition. You can compete in one, in several, or in all events. Before you start, check the world records to see how others have done before you.

Hotdog aerials begin when you press a key to swoop down the ramp. Next, you press various keys to perform tricks such as mule kicks, daffies, and flips. You'll be judged on degree of difficulty and form. An international panel of judges scores your performance, and at a successful landing, the crowd roars.

The biathlon is a cross-country ski race and marksmanship competition. To ski, move the mouse rhythmically from side to side. Every so often you must stop, aim, and shoot your rifle at five targets—you lose points for every target missed. Ski as fast as you can, but remember that your pace affects your pulse rate, and a high pulse rate makes aiming very difficult. The biathlon scenery is interesting but repetitive.

Now it's time for figure skating. Using the keyboard, you can be a regular Peggy Fleming. You must execute seven tricks—camel and sit spins, double- and triple-axel jumps, double- and triple-lutz jumps, and the camel-into-sit-spin combination. Flow with the music, be graceful, and don't forget to hit the landing key or you'll fall—adversely affecting the judges' scorecards. And never try a triple-axel while skating backwards!

For the ski jump, click the mouse to start your descent, then time your second click to jump from the end of the ramp. At that point the scene shifts from a close-up of the ramp to a long view of the mountainside, with a small inset window showing your form (see "Take-Off"). Proper form yields longer jumps and impresses the judges. With the mouse you adjust your aerial position as wind resistance pushes you out of the optimum form.

Free skating is just like figure skating, but with different music and a longer program. This time you must do each trick three times and perform with artistry to impress the judges. Be creative.

My favorite event is the bobsled. The map shows the course and your position on it. But forget the map; watch where you're going—an insert window looks over your shoulder and down the throat of the bobsled tunnel. Use the mouse to lean into the curves. Going too high on a curve costs you speed or causes a crash. You may crash a lot at first, but eventually you'll master the course and start improving your time.

Take-Off
Gain points from the judges on distance and form.

The Scores Are In

Although I found *Winter Games*'s graphics and sound appealing, I soon reached a plateau—in both skill and score—I could not surpass. The animated opening ceremony may lose its appeal once you've seen it several times. The program lets you skip that sequence but does not let you terminate a competition or practice event midsession.

Playing *Winter Games* in competition with other players, one event after the other, enhances its overall challenge and enjoyment. Many players may find the program amusing, perhaps even endearing, but not enduring.—*Rusel DeMaria*

See *Where to Buy* for product details.

Finished Product
Cut, fold, and glue Toy Shop's printouts into models of old-fashioned toys.

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Knowledge Workers in Toyland

The Toy Shop

Templates for constructing cardboard models. Pros: *Offers numerous models; allows the user to customize models.* ***Cons:*** *Difficulty level makes product unsuitable for younger children.* ***List price:*** *$64.95.* ***Requires:*** *512K.* ***Copy protection:*** *Key disk.*

With Brøderbund's *Toy Shop,* a Macintosh and an ImageWriter can help you create up to 20 old-fashioned mechanical toys with moving parts, including an antique truck, a carousel, and a steam engine (see "Finished Product").

The idea behind *Toy Shop* is simple: you print out individual parts and then assemble the toys. The pieces that make up each toy are stored as graphics on the disk. The ImageWriter prints out sheets of parts; you then affix the sheets to adhesive-backed cardboard, cut out the pieces, and assemble the toy. The assembly procedure is not so simple. I spent quite a few hours putting together a medieval cardboard catapult but was eventually rewarded with a sturdy weapon capable of lobbing paper clips a fair distance.

A Model Program

Toy Shop comes on three disks: a program disk and two disks containing the graphics for the toys. When started, the program displays a list of toys. Click on a toy to start construction, and a screen appears with a picture, a description of the toy, and a number of options. From here you can customize the model's paint patterns, decals, and lettering.

To change a paint pattern, click the Paint button. A Paint Options window springs to the screen, listing the parts of the toy that may be repainted with one of *Toy Shop*'s 40 fill patterns. If none of the patterns appeal to you, you can create your own with an option similar to *MacPaint*'s Edit Pattern.

Similar options allow you to type text in a variety of fonts or modify a decal. The Decal Editor window provides a miniature *MacPaint* that you can use to retouch or even entirely redraw a decal. If you want to apply commercial clip art, a digitized image, or a *MacPaint* drawing as a decal, a desk accessory called CatchPaint copies *MacPaint* images into the Decal window.

You can save the customized version of your toy as a separate file or print out the toy pieces. Then, after attaching the paper printouts to cardboard backing, you're ready to construct a toy.

Literal Cut and Paste

It takes skill and patience to assemble a model—along with scissors and a number of other supplies. *Toy Shop* includes 25 sheets of cardboard backing and a package that contains wooden dowels, wire, rubber bands, balloons, and string (refill packs are available from Brøderbund). Depending on the toy you choose, you may also need a hobby knife, a metal-edged ruler, white glue, super glue, or needle-nose pliers.

Toy Shop's manual provides clear, illustrated instructions for each model, which is rated either Easy, Medium, or Challenging. Brøderbund wisely suggests you start with an easy one.

Since cutting, scoring, and gluing countless cardboad pieces is a painstaking and meticulous task, I wouldn't recommend *Toy Shop* to anyone who's sloppy or impatient. And since building the models entails using such items as a hobby knife and super glue, it's not recommended for young children. *Toy Shop*'s models are clever and intricate, and if carefully constructed, they actually work.—*Erfert Nielson*

Note: If you enjoy this type of model building, two similar Macintosh products are available. Simon & Schuster's Great International Paper Airplane Construction Kit *includes 13 paper-airplane templates and* MacPaint *decals, and JemmStar's* MacMiniatures *lets you construct a tiny living-room set out of* MacPaint *images.* □

See *Where to Buy* for product details.

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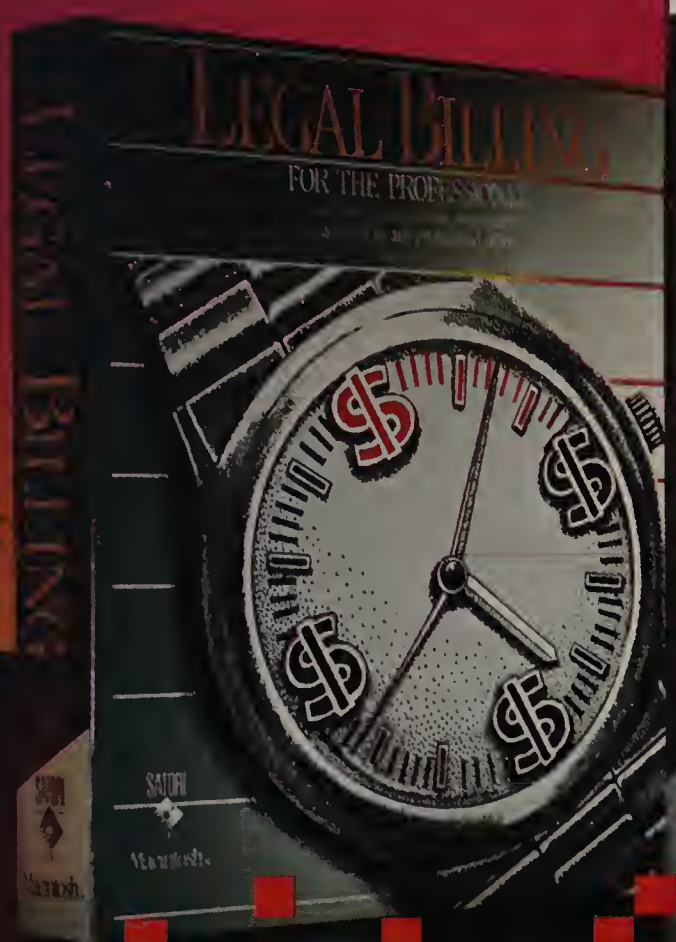

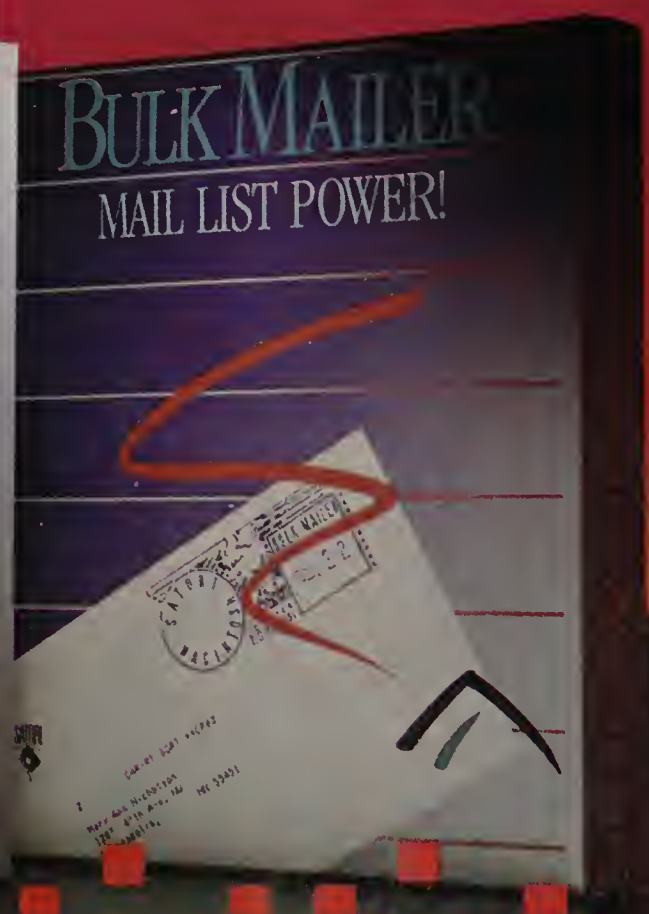

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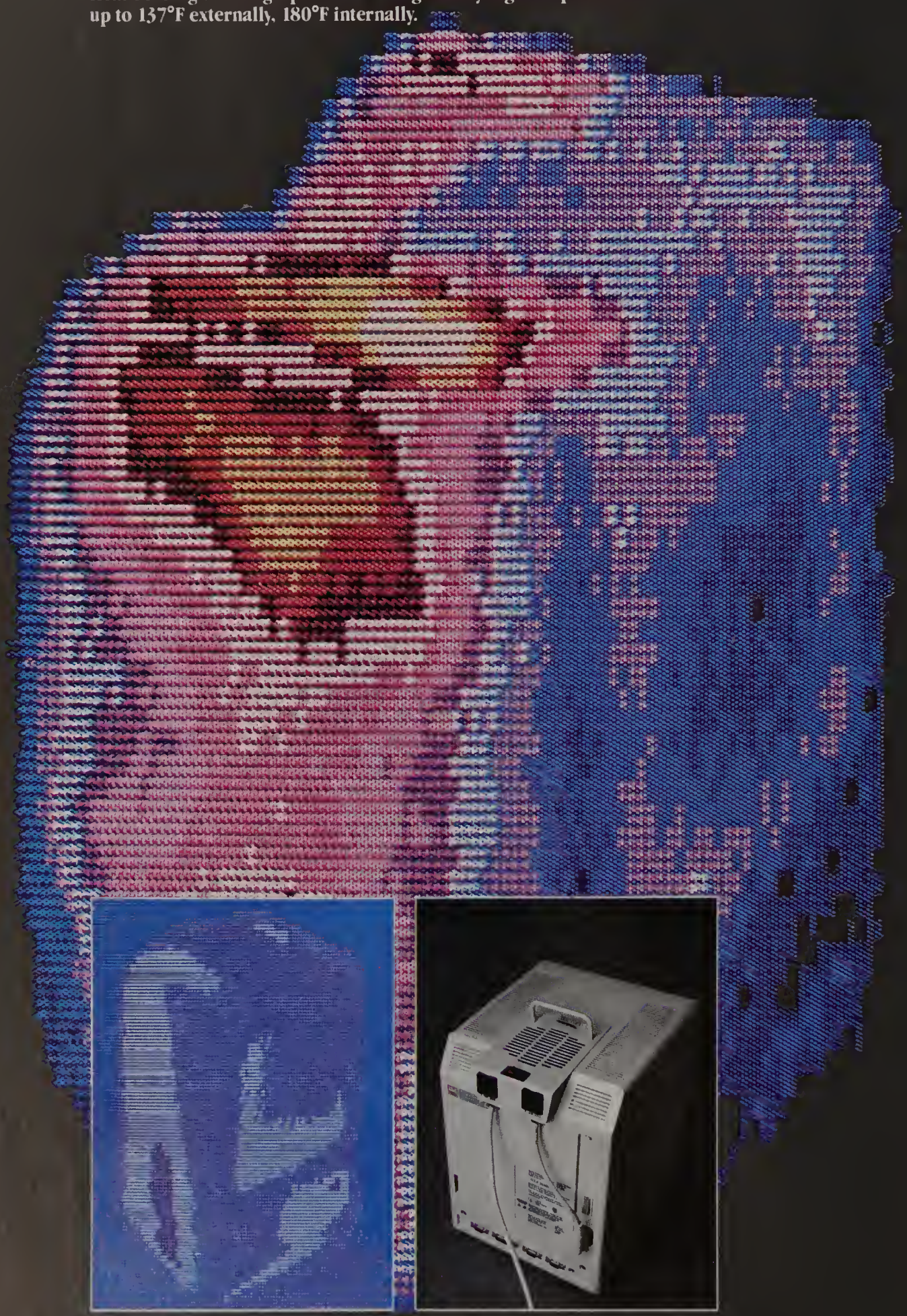

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Circle 255 on reader service card

Quick Tips

Answers to your questions

by Lon Poole

Occasionally readers' experiments result in better solutions to a problem than I've given in the column; if you've found a better technique, please pass it along. July's *Get Info* item about printing large *MacDraw* documents inspired Martin C. Haywood to show us his way of doing it, which avoids system errors and other difficulties: printing from the Finder. Just select the document's icon and choose Print from the File menu. Haywood claims this method worked with a drawing he'd previously been unable to print, even after he'd removed as many extras as possible from the application disk (as I advised).

Q ImageWriter as Typewriter

I would like to use my system as a typewriter—that is, to print characters, spaces, and returns one at a time. I have not been able to write an MBASIC 2.1 program to do this. The ImageWriter II apparently accepts and prints only one line at a time. Am I wishing for the impossible?

Neal Ekengren
Lees Summit, Missouri

A The ImageWriter print head can't stop and start as it moves across the page, so it can't print one character at a time as a typewriter does. Subject to that limitation, the desk accessory *TypeNow* ($39.95 from Mainstay, 28611B Canwood St., Agoura Hills, CA 91301, 818/991-6540) does turn a Mac and ImageWriter into a memory typewriter. With *TypeNow* you type a line in a window on the Mac screen. When you press Return at the end of the line, the line prints in one of the ImageWriter's native draft-quality fonts: Pica, Elite, Pica Proportional, or Elite Proportional, among others. *TypeNow* prints no screen fonts (such as Geneva or New York). It's great for typing envelopes and mailing labels, but because of the printer's insistence on line-by-line printing, *TypeNow* is harder to use for typing airbills and other forms requiring you to fill in several boxes on a single line.

Q ImageWriter Control Codes

I have an ImageWriter I and want to print my *MacWrite* mailing list on one-up labels that are only 3¾ inches between the pin-feed sprockets. Because of the position of the left sprocket and *MacWrite*'s minimum left margin of about 1 inch, my addresses start in the middle of the labels rather than at the left edge. The printer has a command code, ESC L nnn, that is supposed to allow me to alter the printer's left margin. How do I send the printer this command code?

Eugene B. Beckman
Boonton, New Jersey

A Since your labels are narrower than regular paper, you're probably moving the right pin-feed sprocket to the left when you roll the blank labels into the printer. Before doing that, loosen the left sprocket and move it an inch to the right, thereby compensating for *MacWrite*'s minimum left margin. The left margin will be on the platen to the left of the labels, but *MacWrite* won't be any the wiser.

If you're determined to experiment with ImageWriter command codes, get the public domain program *WriteStream* by Eagle I. Berns (available from user groups such as BMUG, 1442A Walnut St. #62, Berkeley, CA 94709, and from GEnie's Coffee MUG, file number 1468). It allows you to add Escape and Control codes to any text-only document. Since you cannot type Escape and Control characters directly, you substitute two obscure but typeable characters. You designate the Escape and Control substitutes by typing them at the beginning of the document, and use them throughout the document whenever you need printer commands. When *WriteStream* prints the document, it sends the printer the real command codes, not the stand-ins. You must save the document as a text-only file and print it with one of the ImageWriter's native fonts rather than a Mac screen font. For a complete list of ImageWriter command codes, see the ImageWriter owner manual.

Q MacDraw Misalignment

When I reopen a detailed *MacDraw* document, why do I find that objects have shifted slightly? More importantly, how can this be fixed? Locking objects doesn't seem to help. I've tried grouping, but some objects still shift; even some vertical lines drawn with the straight-line tool end up crooked when I reopen the drawing. The borderless white boxes I use to hide parts of objects always seem to shift and reveal fragments underneath. Also, text with a white background moves. Is there a way of locking objects that will keep them where I want them?

Verna Webb
San Jose, California

A A known problem with *MacDraw* versions 1.7 and 1.9 (the current version) may cause objects to shift if they're grouped, selected, and moved while the Grid feature is active. Science has discovered no permanent cure for this

(continues)

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misalignment disease. For a partial cure, turn the Grid off, select the entire document, and then copy and paste it to a new *MacDraw* document. Be aware, however, that objects may become restless again as you manipulate the new document. We can only hope for an upgrade that fixes this problem.

Q Print Screen on LaserWriter

How do I print the contents of the screen to a LaserWriter? Pressing ⌘-Shift-4 works only with an ImageWriter.

Robert Wardell
San Francisco, California

A First, capture the screen image in a *MacPaint* file by pressing ⌘-Shift-3. Then print the file (which will have a name like Screen 0) using *MacPaint* or a *MacPaint*-compatible application. Note, however, that ⌘-Shift-3 and other ⌘-Shift-digit sequences won't work on a Mac Plus or a Mac 512K Enhanced when the mouse button is down. This makes it impossible to capture a pulled-down menu, for example. Fortunately, the public-domain desk accessory *Camera* by Keith A. Esau (available from user groups such as BMUG, 1442A Walnut St. #62, Berkeley, CA 94709, and from CompuServe's MAUG, file CAMERA.DA in DL1) takes a time-lapse picture of the screen. You specify, in seconds, the delay before the "shutter" snaps and *Camera* records the screen to disk, regardless of the cursor's position at the time—unless disk activity is in progress.

Q BASIC Program Memory

How much memory is available for BASIC programs and data after loading MBASIC in a Mac 512K? In a Mac Plus?

Monchito G. Mandap
Garland, Texas

A MBASIC programs use three areas of the Macintosh's memory: the stack, the heap, and the BASIC data segment. The stack keeps track of subroutine and subprogram return locations, FOR . . . NEXT and WHILE . . . WEND loops, user-defined functions, information for some of the ROM routines, and system informa-

(continues)

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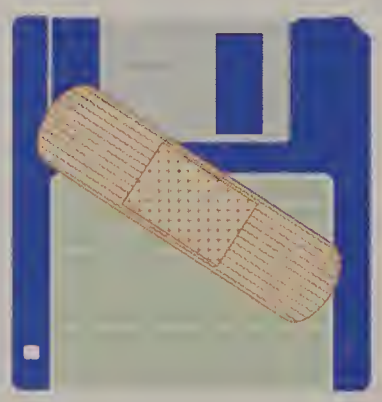

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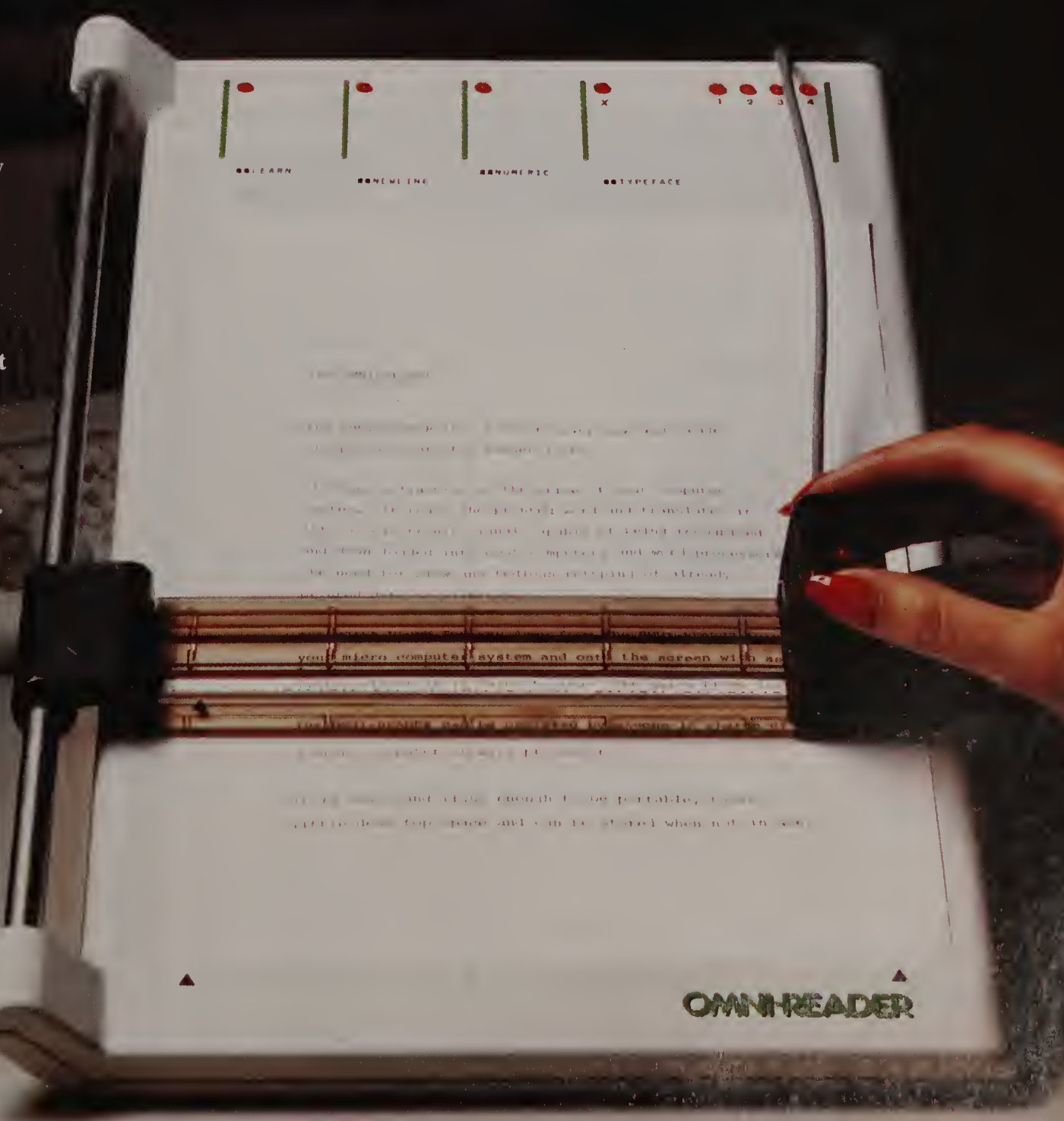

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tion. The heap contains some of the BASIC interpreter, buffers for SOUND and WAVE statements, PICTURE statement data, buttons, edit fields, and active desk accessories. The data segment holds the BASIC program lines, numeric variables and strings, and file buffers.

The data segment normally takes about 333K on a Mac 512K, 325K on a Mac 512K Enhanced, and 849K on a Mac Plus. The heap normally uses about 53K on an old Mac 512K and 61K on machines with 128K ROM. In all cases the stack takes up approximately 12K. Remaining memory is used by the Mac operating system, the BASIC interpreter, and the display screen.

You can reallocate memory among the heap, the stack, and the data segment with a CLEAR statement, subject to some limitations. To determine how memory is currently allocated to the heap and the data segment and to see how much stack memory is still available, use the FRE function. For details see pages 71, 72, 73, and 110 of the BASIC manual.

Q Reset versus Power Off/On

You once said that the only difference (in results) between restarting the Mac with the programmer's switch and turning the Mac off and then on again was the state of the AppleTalk connection. I would add another: pressing the programmer's switch does not invoke the self-test diagnostics.

Bill Hailey
Houston, Texas

A You're right, and what I said earlier is now partly wrong. I reported seeing AppleTalk disconnected after I turned off an older Mac 512K (with 64K ROM) on which I'd connected AppleTalk using the old Choose Printer desk accessory. Apparently, the new Control Panel desk accessory (version 2.0 or above) is more effective at connecting AppleTalk; perhaps something in the new System file (version 3.2 and above) or the 128K ROM is partly responsible. At any rate, turning off a Mac 512K Enhanced or a Mac Plus does not disconnect AppleTalk. Pressing the programmer's switch has never disconnected AppleTalk, nor has using the Shut Down command.

(continues)

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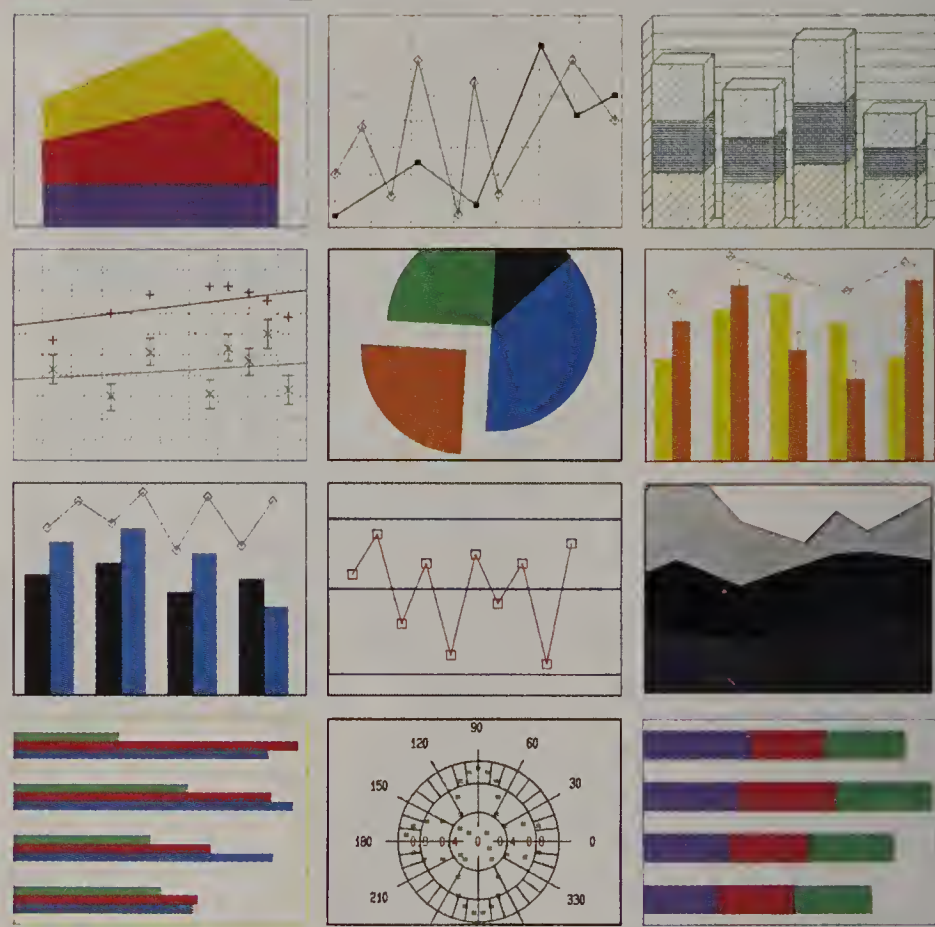

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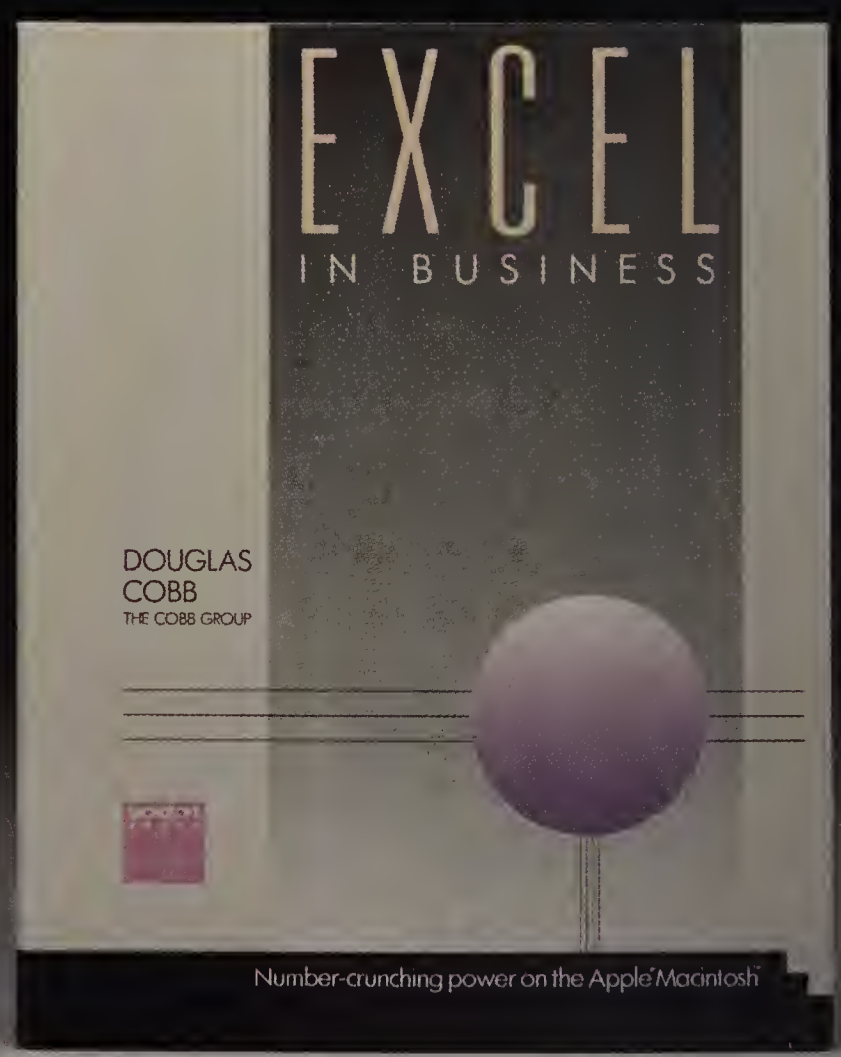

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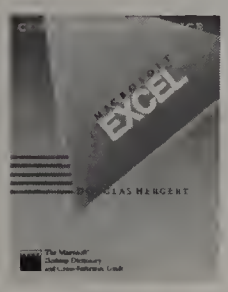

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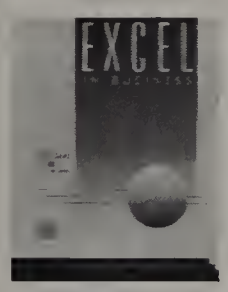

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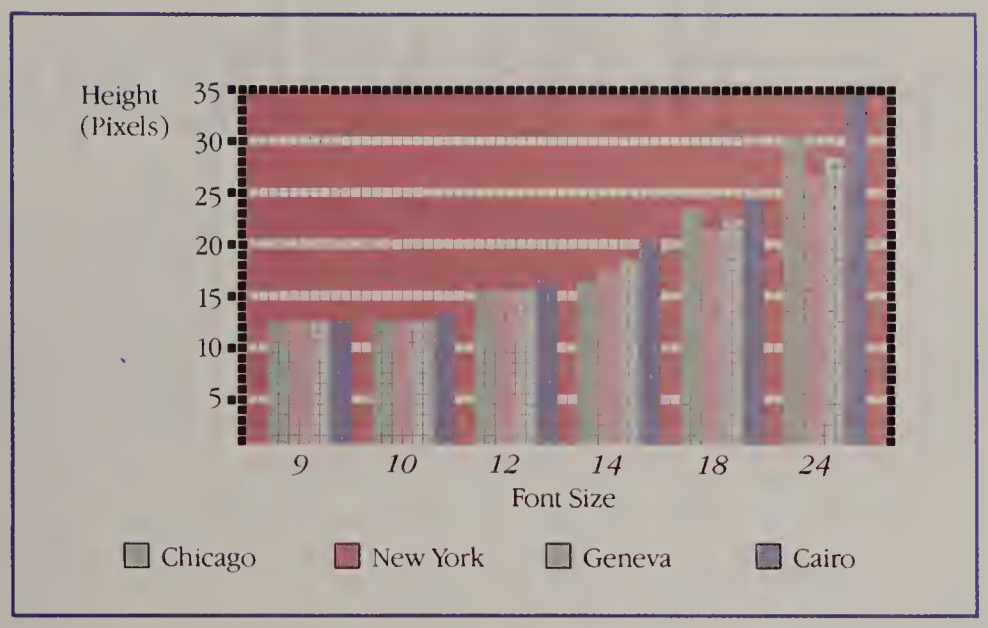

Font Heights
Because large font sizes are taller than small sizes, you can change font size to adjust the spacing in MacWrite *headers and documents.*

The 128K ROM performs an extensive memory check when you turn on the power. The memory check, which takes about 8 seconds on a 1-megabyte Mac Plus, does not occur when you press the programmer's switch or use the Shut Down command. You can skip the memory check when you turn on the Mac if you hold down the mouse button until the Mac beeps. Holding down the mouse button after the first beep ejects the floppy disk in the internal drive.

Q Larger MacWrite Headers

How can I enlarge the headers in *MacWrite?* I want headers of more than six lines, but whenever I get six lines down, I get the message "This operation will give this document too many paragraphs."

John W. White
Cheshire, Connecticut

A *MacWrite* limits headers and footers to six paragraphs, but each paragraph can span many lines. A new paragraph begins only when you press the Return key, insert a formatting ruler, or paste a picture. You can type a multiple-line paragraph by placing a tab marker anywhere in the formatting ruler and pressing the Tab key repeatedly. Using this technique, you can get as many as 15 lines in the header and footer windows.

The height of a header or footer depends not only on the number of lines it contains, but also on the height of each line. The font and font size of the largest character on a line determine its height. Therefore, you can make a line taller by selecting it and choosing a taller font or font size. Choosing the Outline or Shadow style increases its height even more. See "Font Heights" for a comparison of several popular fonts in various sizes.

Q Avoiding Accidental Reset

Recently a friend was sitting next to my Mac. He rested his arm on the table near the Mac and inadvertently pressed the back part of the programmer's switch on the side of the Mac, causing a system error. During his visit I reset my Mac a couple of times before I figured out what was happening. Is there a protective cap I can put over the switch or some other method of preventing such accidents?

Debra A. Rainville
Marlboro, Massachusetts

A You don't need the programmer's switch if, like most people, you use it only to restart after the Mac hangs or crashes grotesquely. Under those conditions it's just as easy to restart by switching the power off and then back on, and this shouldn't happen often enough to prematurely wear out the power switch (which used to be a problem on Apple IIs). To remove the programmer's switch, pry it off carefully with a screwdriver or another flat-bladed tool.

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Getting Started with Disks

How disks work, why they sometimes don't, and the differences between HFS and MFS

by Jim Heid

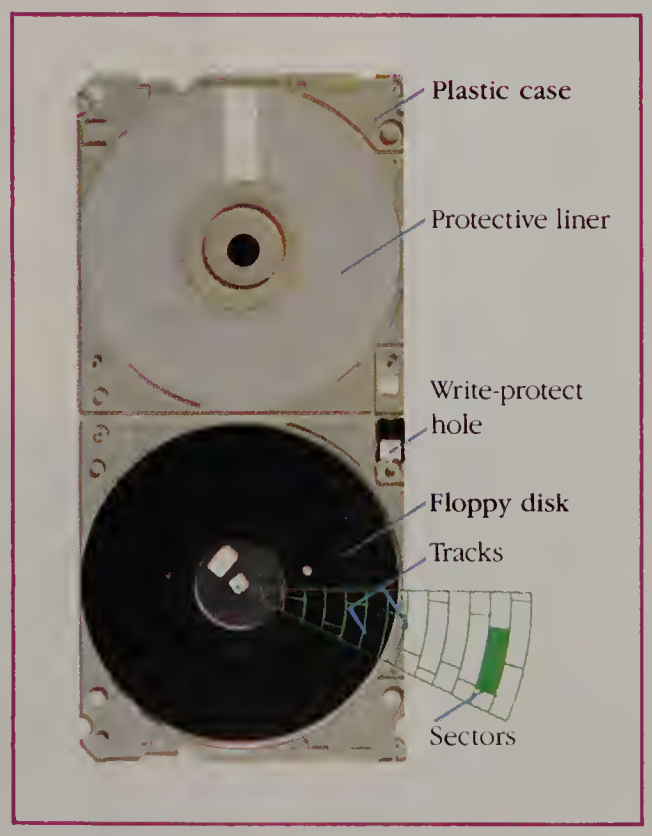
It's almost frightening when you think about it. Millions of micro-, mini-, and mainframe computer users crank out megabytes of facts and figures that help run countries, businesses, schools, and homes and trust all that information to . . . magnets. Magnets? The same things that hold shopping lists to refrigerators? Essentially, yes. In their most basic form, your valuable data and expensive applications are nothing but millions of iron particles, organized into patterns by a magnetic field as they ride in circles at hundreds or thousands of revolutions per minute. It *is* frightening when you think about it.

Fortunately, magnetic data storage is also very reliable. Magnetic storage has served the computer world faithfully for decades, thanks to sophisticated manufacturing techniques and to operating system software that manages the entire process. This month, I examine the modus operandi of disk drives, explain how the Mac keeps track of files, and spotlight the differences between the disk-management software of 128K and 512K Macs and that of Mac Pluses and enhanced 512Ks.

A Magnetic Voyage

Inside a floppy's plastic case is a disk of flexible—that is, *floppy*—plastic coated with iron oxide particles (see "Inside a Disk"). This disk spins at 390 to 600 revolutions per minute as it is being accessed. When the Mac saves a document or copies a file, a *read/write head* in the disk drive generates a magnetic field that positions the disk's iron particles in patterns corresponding to the zeros and ones that comprise the information being written. When the Mac reads from the disk, the particles re-create the magnetic field in the head.

A disk is divided into 80 concentric circles called *tracks,* and each track is divided into wedges called *sectors.* The number of sectors in a track depends on the track's location; tracks located near the disk's outer edge have room for more sectors than the smaller tracks closer to the disk's center. The disk's rotation speed varies depending on which tracks the read/write head is accessing, accounting for the dirgelike melody hummed by 400K disk drives.



Inside a Disk
Opening a disk's case reveals the floppy disk it protects. What you can't see is how the disk is divided into concentric rings, or tracks, containing sectors that organize the data.

The Mac Plus premiered with 800K disk drives, which double storage capacity by using both sides of a floppy disk. 800K drives have two read/write heads, one for each side of the disk.

You can look at a phonograph album and see grooves, but you can't look at a disk and see tracks and sectors. A disk's divisions aren't physical ones; they're magnetic boundaries recorded on the disk when it's initialized. This software approach to disk *formatting* allows many other computers to use the same 3½-inch disks that the Mac uses. Fresh out of the box, the disks are identical lumps of storage clay. Each computer's operating system sculpts the disk to its own needs by formatting it.

Part of the sculpting process involves creating the tracks and sectors; the other part involves reserving parts of the disk to hold special information. Some tracks hold start-up software—the instructions that either transfer control to the Finder (or the MiniFinder) when you start the Mac or eject the disk and display the blinking *X* icon to indicate that the disk can't start up the Mac. Other tracks hold information about the disk's contents, so the Mac can locate documents and applications and determine where a disk's available space is.

(continues)

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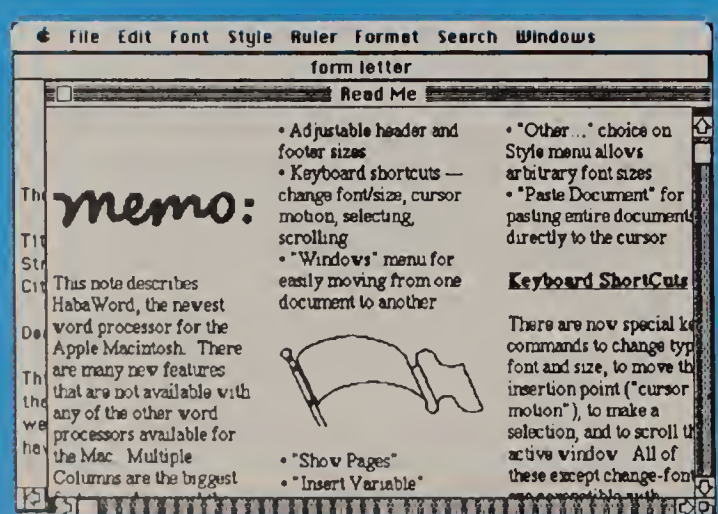

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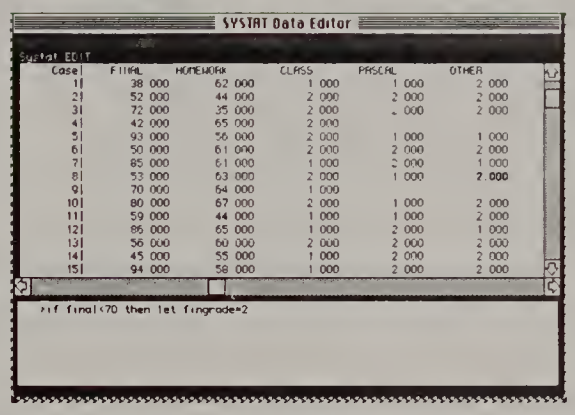

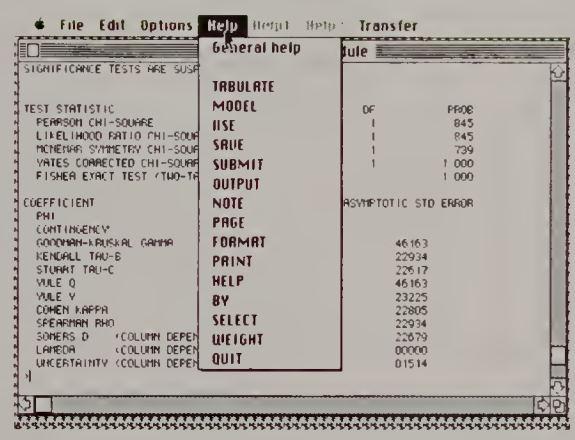

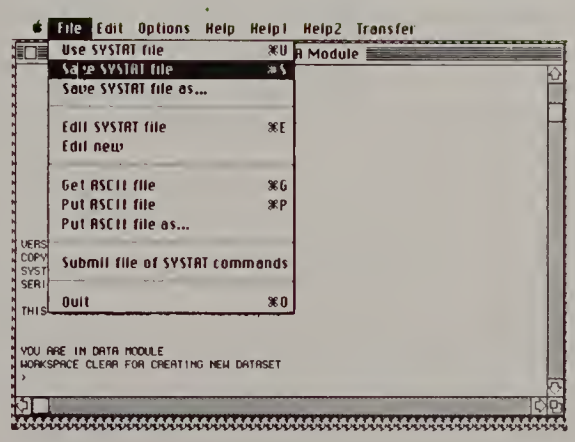

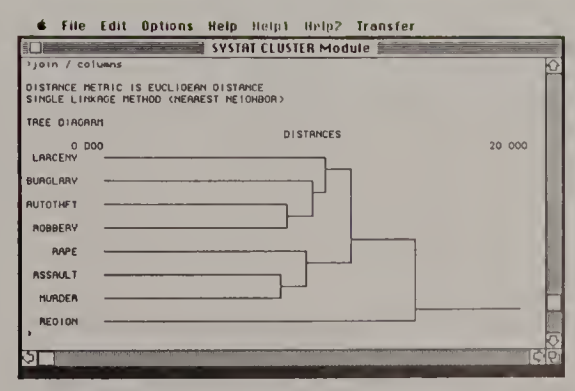

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Harder Disks to Fill

When you start taxing the limits of floppy disks—by storing a huge mailing list or that Pig Latin translation of *War and Peace* you've been working on, for example—it's time to think about a *hard disk.* One hard disk has the capacity of 25 or more floppy disks, making vast amounts of data available quickly and conveniently.

Hard disks work much like their more supple siblings, except that they store data on a number of precision-machined, rigid platters sealed in a dust-free chamber. A hard disk's read/write head doesn't touch the disk's surface but rides a minute distance above it as the disk spins. The additional disk platters, their faster rotation, and the drive's overall greater precision give a hard disk its cavernous capacity and high speed.

Hard disks do have a reputation for vulnerability, however. A mere speck of dust on a disk platter can cause a *head crash,* the disaster that occurs when the read/write head slams into the dust particle

An Ounce of Prevention

- Keep disks away from items that produce magnetic fields—audio speakers, electric motors, telephones, the front of the ImageWriter, high-intensity desk lamps, and, of course, magnets.
- Keep disks comfortable. Don't leave them in a sun-baked car or near a radiator.
- Don't place an external disk drive to the left of the Mac. The Mac's power supply there generates magnetic fields that can cause disk errors.
- Be gentle. Don't slide a disk's shutter open and touch the inside. Don't trust a disk's plastic case to protect the disk in the mail; use cardboard disk mailers.
- Buy quality disks. You've made an investment in your Mac; don't skimp on something as relatively inexpensive as a disk. With 800K drives, be especially rigorous about backing up if you convert 400K disks for double-sided operation; the flip side of the 400K disks may have a higher failure rate.
- Use the write-protect tab to guard against accidental erasure. Slide the tab toward the disk's shutter to lock the disk. You can see straight through the write-protect hole of a locked disk. The Finder indicates a locked disk by displaying a padlock icon in the upper-left corner of the disk's window.
- Make frequent backups. Use the Finder to back up floppy disks, and use a backup program with hard disks. Don't store backups along with originals—that won't protect your data from fire, theft, or water damage.

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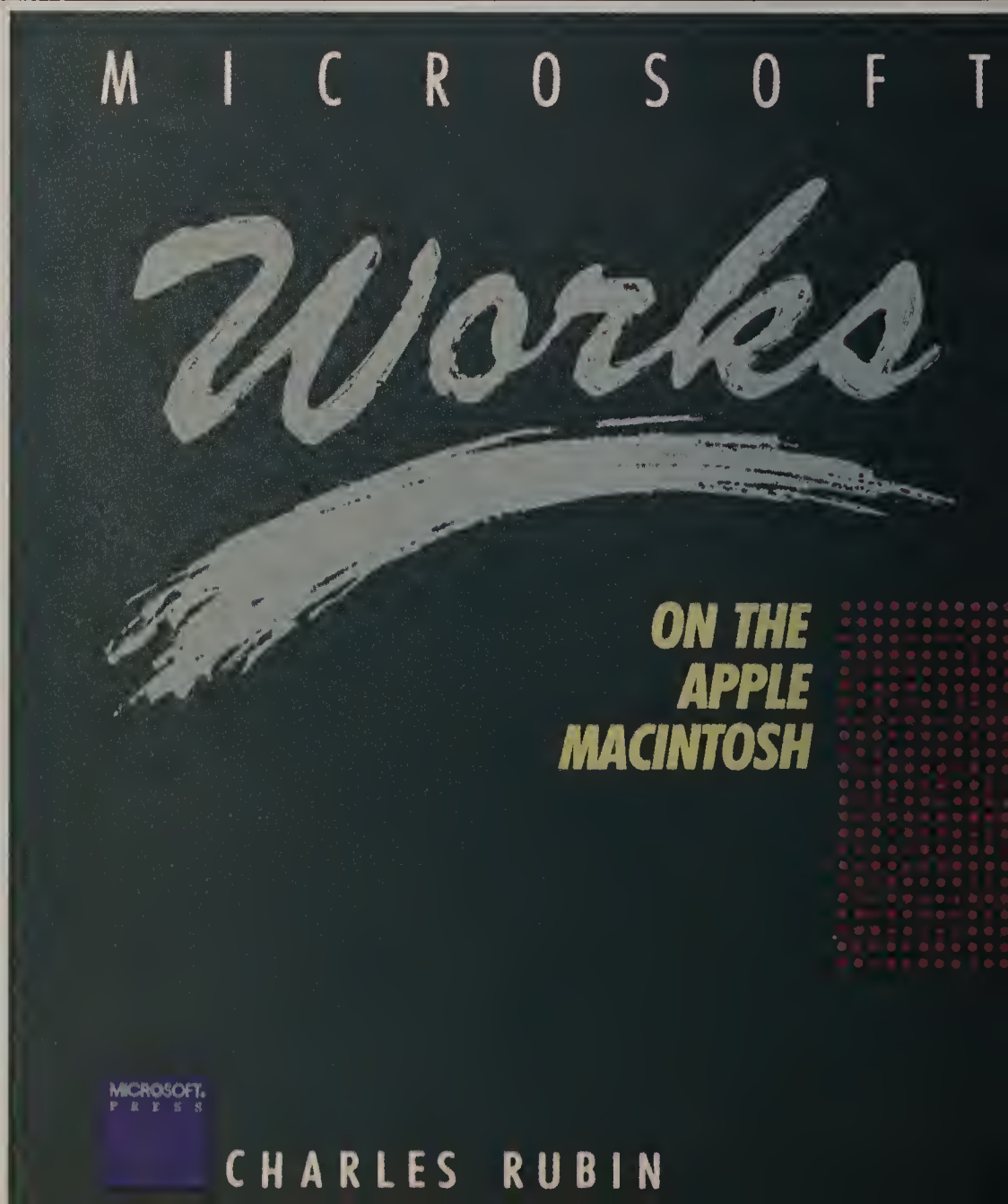

and then bounces up and down a few times on the disk's fragile surface, often damaging the head and the disk platter. Head crashes usually spelled doom for early hard disks, but more durable surface materials make today's models more rugged.

Check Your Directory

Whether it's accessing a floppy or a hard disk, the Mac's operating system needs a disk's *directory* to locate data. A directory is a table of contents for a disk, containing the name and location of every file. When you throw a file away, its directory entry is removed, and the directory is updated to signal that the file's tracks and sectors are available. The file itself, however, remains on the disk until another takes over its turf.

As you might guess, a healthy directory is vital. Damage a disk's directory, and the disk might as well be blank. The Mac won't be able to find a file any more than you could locate a newspaper article based on the description, "It's the one with the headline."

If you get an error message after inserting a disk, don't consider the disk a write-off. You may be able to resurrect its contents by using a special program called a *disk editor* or *sector editor*. A disk editor takes the disk at face value and may be able to access information that the Mac thinks is gone. Just as you could recreate a book's table of contents by searching for the beginning of every chapter, many disk editors can restore deleted files or reconstruct a damaged directory by examining the disk's contents and making sure the directory accurately reflects them (see "Recovering Damaged Disks," *Macworld,* November 1985). MacMaster Systems' *Fedit* (short for "file editor") is widely regarded as the best Macintosh disk editor. *First Aid* is a promising new disk editor and repair program from First Aid Software (800/843-3497; 617/847-4190 in Massachusetts).

A disk editor might be able to revive a tired disk, but using one generally means having to grapple with technicalities like allocation block maps and sector tags. Moreover, disk editors can fix only magnetic problems, not physical ones. There's little hope for a disk that someone has used as a drink coaster or to prop up an uneven table leg. For these reasons, the best way to avoid trouble is to back up your disks frequently and take care of them (see "An Ounce of Prevention").

Directories within Directories

In the days preceding Apple's Hard Disk 20, a disk's directory contained enough space to store names and information for roughly 100 files—adequate for a 400K floppy disk's relatively limited confines but not enough to store a list of the files available on a hard disk.

Most hard disk manufacturers circumvented the limitation by adding *partitioning* software, which magnetically divides a hard disk into *volumes,* each of which is treated as a separate disk by the Mac. Most manufacturers also enlarged the size of the directories on the volumes, allowing each to store more files.

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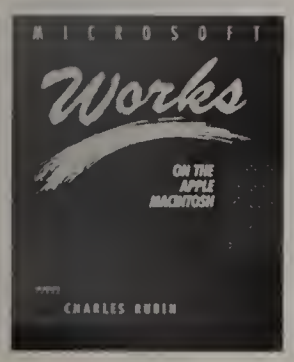
What to do before you go to Works.



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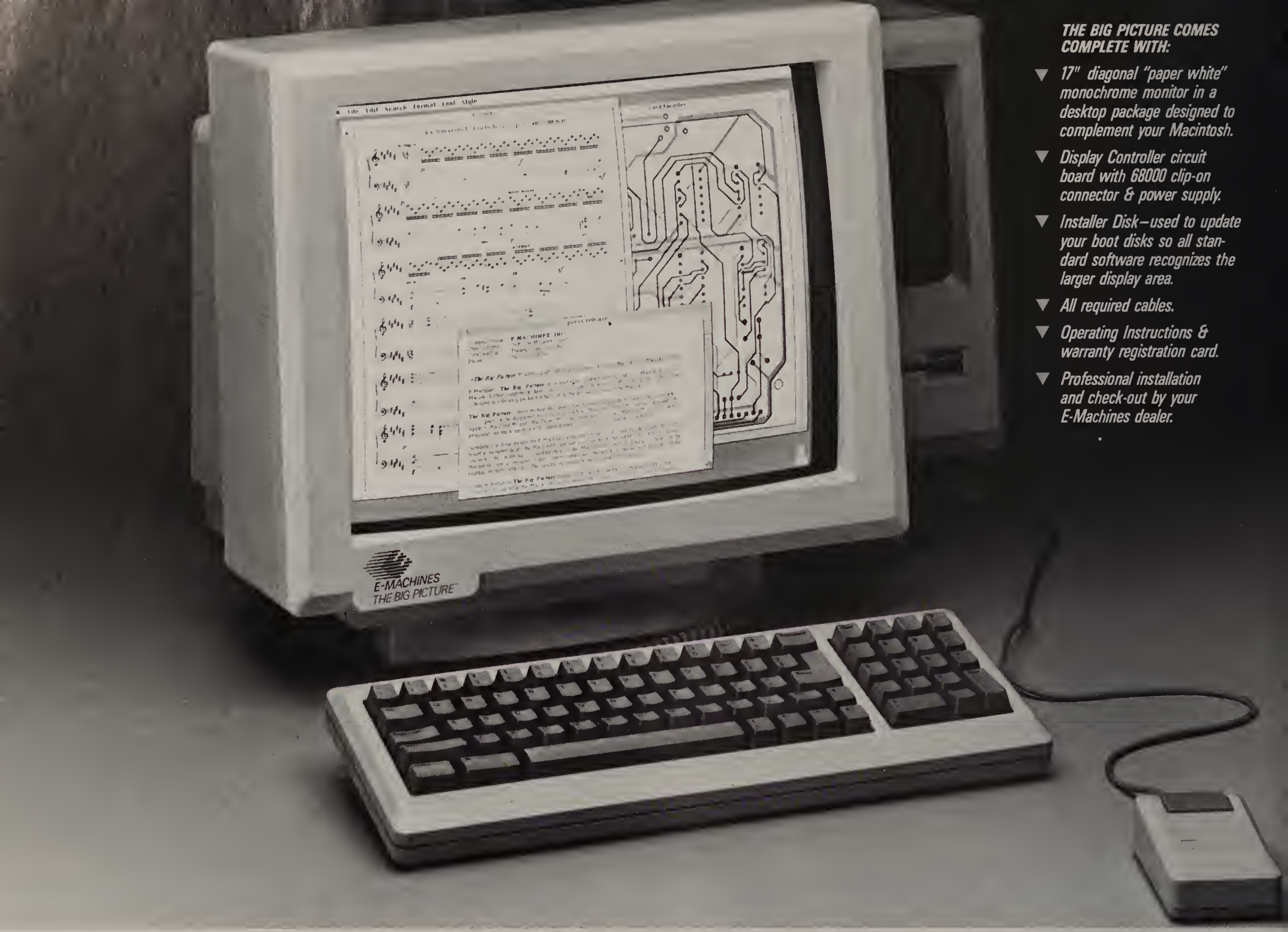

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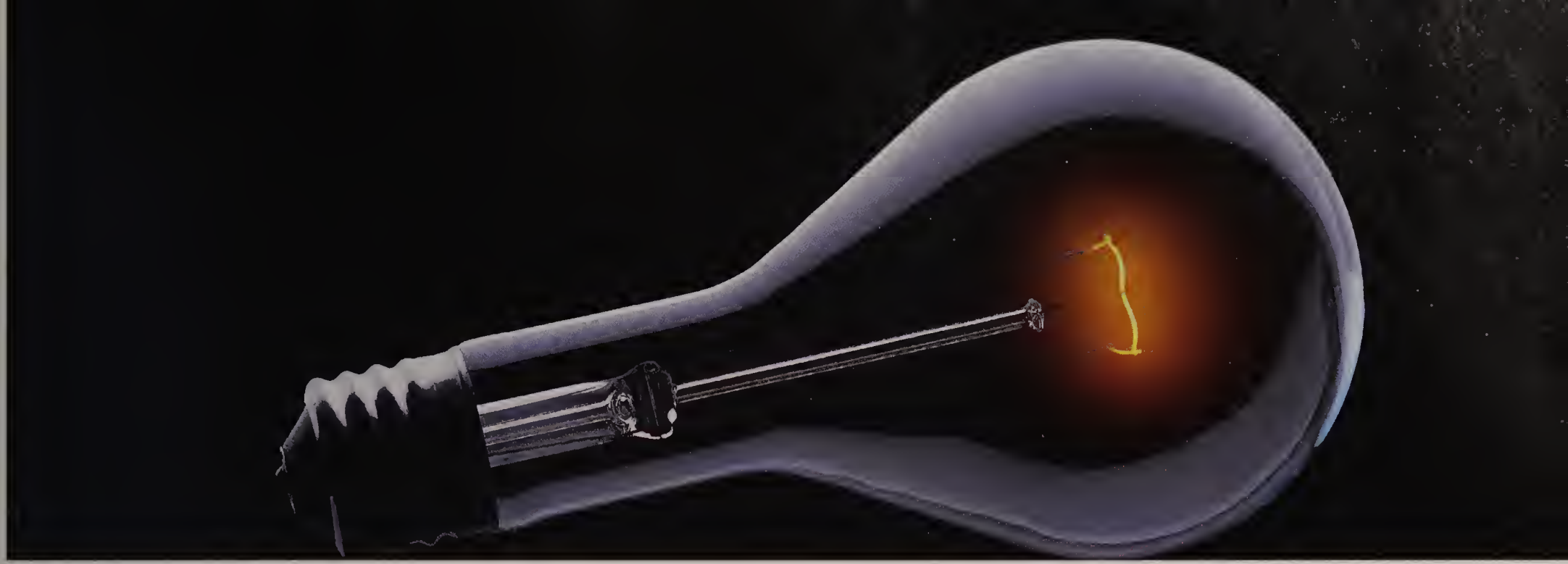

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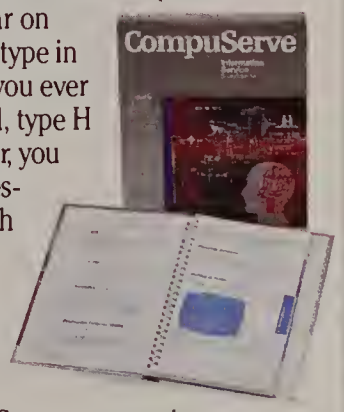

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These workarounds improved the storage situation but were imperfect as overall solutions. Because the Finder must reach out and touch all the files on a disk to display their names and icons, its performance became pathetic as the number of files on a hard disk grew. Also, organizing hundreds of files on a hard disk was cumbersome. You could neaten the Finder's desktop by storing related files in folders, but the folders' organizational virtues vanished once you started an application. Locating one file name in an Open dialog box meant scrolling through dozens or even hundreds of others.

Apple's Hierarchical File System changed all that. Called HFS by those of us who stumble over the word *hierarchical,* the new disk-management software changed folders from cosmetic niceties into special storage units within the disk's directory, each with the ability to store a virtually unlimited number of files. Under HFS, folders and directories take an approach similar to the old box-within-a-box gag: the directory is the biggest box, and folders are smaller boxes snugged within.

Best of all, HFS enables you to open and close folders from within an application's Open dialog box. If you organize your documents according to their purpose or application, you can locate the one you want quickly (see "Order out of Chaos," *Macworld,* May 1986). Hard disk users still might spend 5 minutes rifling through folders in search of a particular document, but file-locating products like PBI Software's *Locater Plus* desk accessory can simplify the process by allowing you to search all the folders on a disk for a given file or for all files created by a certain application (see "Taming Your Hard Disk," *Macworld,* November 1986).

HFS debuted with Apple's Hard Disk 20 and is also the file system used by the Macintosh Plus and enhanced 512Ks. Non-enhanced 512Ks can also use HFS with 800K disk drives or hard disks, thanks to a System file called HD20, which loads the

(continues)

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HFS software into the Mac's memory during the start-up process. (See last month's *Getting Started* for more information on system files.) 512Ks without the HD20 system file, and all 128K Macs, use MFS—the original Macintosh File System.

What does it all mean to you? The biggest issue is compatibility; if you use HFS, the programs you use must be able to recognize its folders. Compatibility problems were rampant shortly after HFS's debut but are diminishing as the file system enters its second year. Disk doctoring is another concern: directories on HFS disks are structured differently than MFS ones, so you'll need an HFS-compatible disk editor to resurrect a damaged HFS disk. These issues aside, whether or not you need HFS depends on your storage media: hard disks all but require its added efficiency, and 800K floppy disks can certainly benefit from it, while 400K disks are better off with MFS. (Indeed, it's possible to create an HFS-format 400K disk, but it has less free space than an MFS one.)

Send $5.95 for Floppy, $14.95 for Compact Disk . . .

Magnets' force in computer storage may be weakening. Compact disks, those silver platters that have made my stereo obsolete, are slowly infiltrating the mass storage world (see "Lighting a Path to the Future," *Macworld,* February 1986). And we are talking *mass* storage: a 5¼-inch compact disk holds as much as 550 megabytes of data, the equivalent of 27½ Apple Hard Disk 20s.

But for all their virtues, compact disks aren't likely to replace magnetic storage for some time. Developing disks that can be erased and reused is one major hurdle, since data is written by a laser that burns pits into the disk's surface. Interestingly, one technology that promises to clear the hurdle uses—you guessed it—magnets embedded in the disk's surface.

So the lowly magnet continues to serve us well and may even have a place in tomorrow's disk drives. Until next month, when we'll probe the world of computer acronyms, be good to your magnets. □

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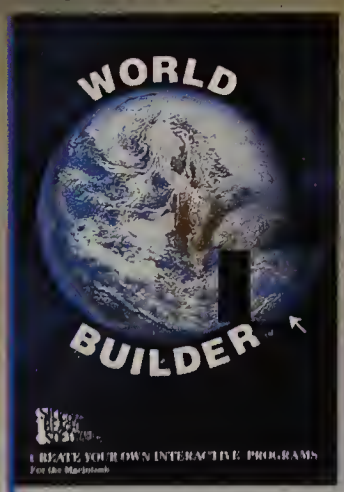

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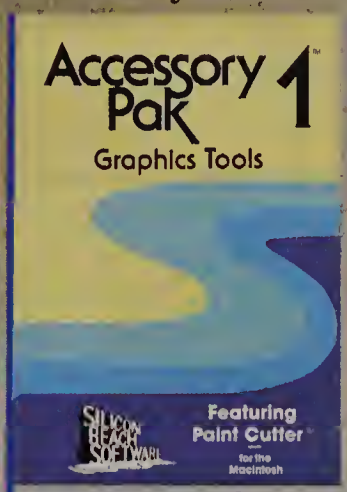

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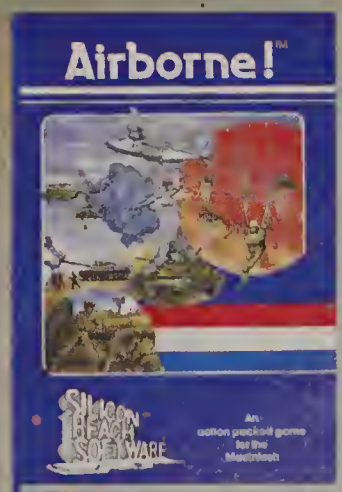

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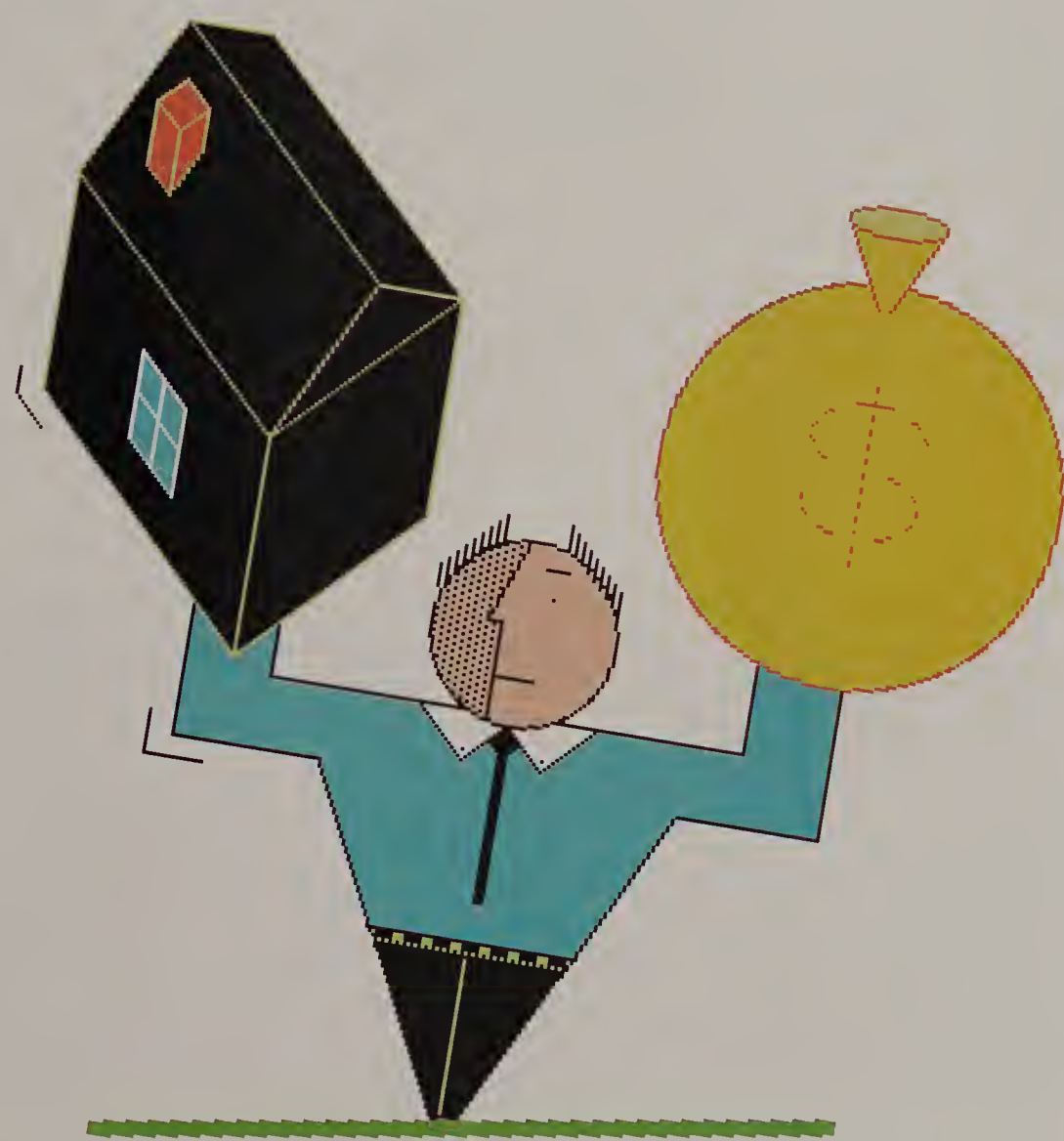
Insights on Dollars and Sense

Tips that help you get more for your money from the accounting program

by Charles Seiter and Daniel Ben-Horin



JOHN HERSEY

The Macintosh version of *Dollars and Sense,* the home accounting program from Monogram, was released at the same time as the Mac was launched in August 1984. The program immediately rose to number three on the Mac software charts and has remained a best-seller ever since. It's a safe bet that about one-third of all Macintosh owners have bought *Dollars and Sense,* or *D$*—the abbreviation used by the staff at Monogram. The program is very competent at modest financial tasks, is a model of Mac interface use, and generally deserves its popularity.

Recent developments allow us to condense a great deal of advice about fixes, patches, and toggles for *D$* into one prefatory tip: get version 1.4. If you bought an earlier version after March 15, 1986, you can receive 1.4 free by sending in your old version and proof of purchase. If you bought *D$* before March 15, you can get 1.4 for $44.95 directly from Monogram. Version 1.4 is not copy protected (requiring no key disk for hard disk operation) and supports HFS. Looking toward the future, Monogram has also added an electronic banking interface called MoneyLink, currently in use at CitiBank and under consideration at several other large institutions.

Many questions raised about earlier versions have been answered with 1.4. How do you keep *D$* from crashing certain desk accessories? Get 1.4. How do you change a mistaken date of last entry? Use the new Audit feature added to 1.4. How do you recover lost sections of a previous year's file? Again, use Audit in 1.4. Basically, the Audit feature allows all types of reconstruction and file rebuilding, which were difficult or impossible with 1.3.

Most of the information we've gathered suggests that *D$* is used primarily for checking-account work and that users could do with some encouragement about extended applications. Personal experience, a survey of Mac bulletin boards, remarks from users, and notes from Monogram's technical support staff produced a variety of tips.

The Balancing Act

Because *D$* is essentially an accounting program, it helps to know a little accounting terminology. The reconciliation balance used in *D$* is defined as reconciliation balance = account starting balance + all cleared deposits − all cleared checks.

(continues)

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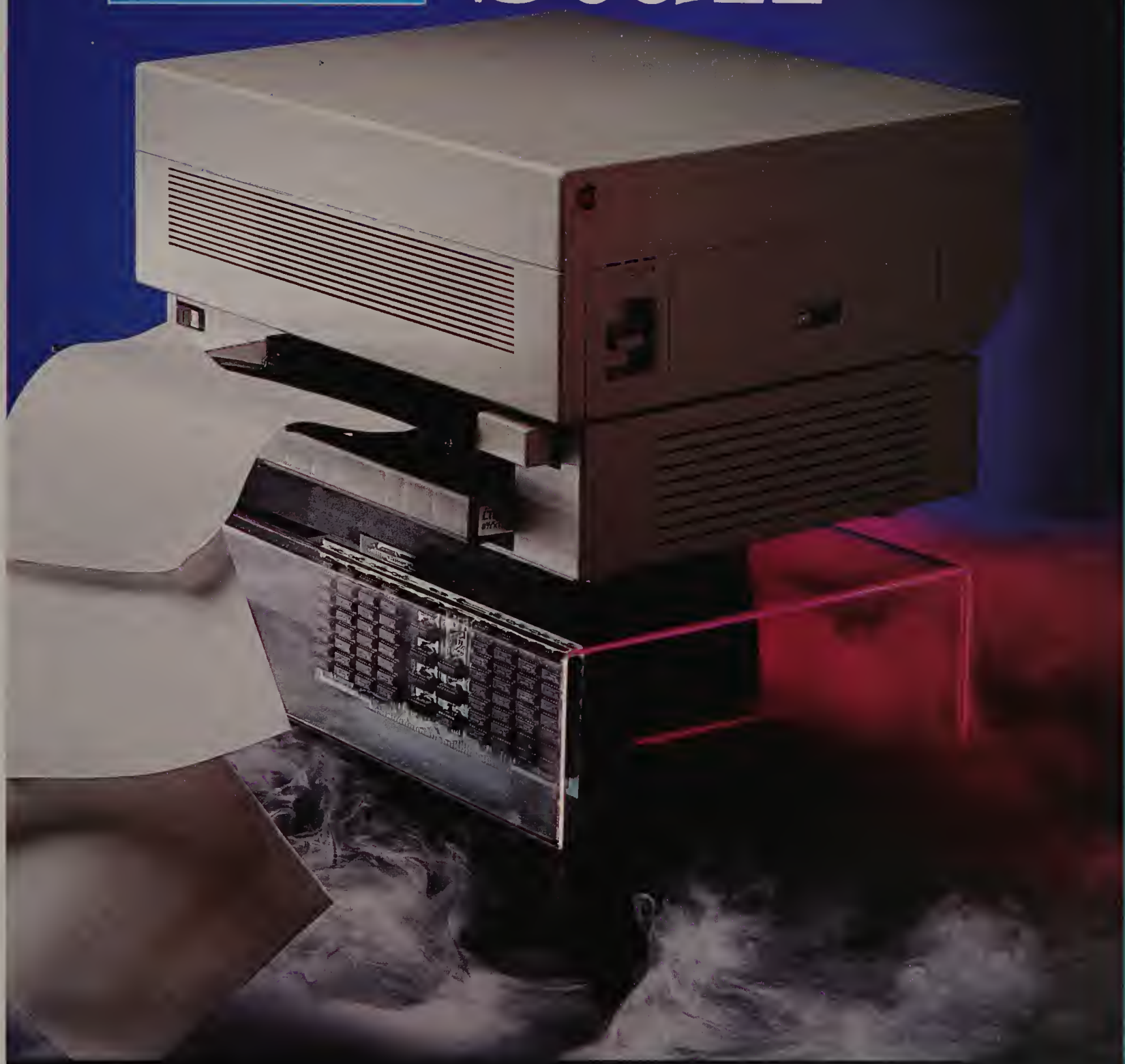

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If your environment has a LaserWriter shared by two or more Macintoshes, then you have already experienced the aggravation of waiting for the LaserWriter, while you could be doing something else.

The LaserServer incorporates a slot system for maximum expandability, it comes in a minimum 2 megabyte configuration, expandable up to 12 megabytes. The slot system also allows for other future enhancements cards such as downloaded fonts etc.

To manage the printing jobs in the LaserServer, one Macintosh on the network is designated as the 'print manager'. The print manager is capable of setting priority levels for all Macintoshes on the network, allowing the most important users faster access to the actual printing on the LaserWriter.

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If the running balance and the reconciliation balance do not match, most often it means that you have somehow put the wrong number in the account starting balance. You might want to set up your files with a zero start balance and then adjust this number when you receive your bank statement.

- **Entering "Expenses" and "Income"**

You can't. Or at least you don't, or you shouldn't. Many *D$* users who first venture beyond checking-account reconciliation find this structure frustrating. The Expense and Income accounts are made up by the program from data entered in the Assets, Liability, and Checking accounts. This is accepted accounting procedure, but apparently it runs counter to the way many people think of the items in their cash flow.

- **Good Things Come in Small Packages**

You probably can't get *D$* to work properly on a 128K Mac unless you use System 2.0 and Finder 4.1 (or earlier). On a 128K Mac you are also more likely to be happy backing up files on the desktop via the Duplicate command than using *D$*'s built-in file-backup procedure.

- **Dummies for Smart People**

There is a reasonably convenient way to update Expense and Income accounts in the middle of the year without churning through all previous transactions distributed to those accounts. You create a *dummy* Asset account with a zero start balance and use the account for New Transactions. Enter the midyear expenses in the Decrease column for this account, and that value shows up as a negative starting balance in Expense if you have chosen an account item distributed to Expense. When all the appropriate amounts have been entered, enter one more transaction, undistributed, under Increase, for the total amount. The correct amount is thus entered for Expense without disturbing other accounts.

- **Playing Tag**

A nice feature of *D$* lets you tag tax-deductible items with a *T*. As the new tax code makes fewer items deductible, the tagging feature may outgrow its original

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use. But you may find it useful to tag files for other reasons: you can use the feature to distinguish business or personal expenses, expenses associated with particular projects, or husband's versus wife's expenses. You can remove the tags at any time.

● Not Just Data . . . Reality

The tagging feature has another application you should investigate, although the results may be horrifying. Go through your accounts and tag all interest payments; then observe what percent of your total income goes out the door as interest (the graphing feature is nice for this). A typical figure in the early 1960s was 6 percent; when a Northern California user group tried the experiment, the results ranged from 11 percent to 51 percent. Strange days on the financial scene.

● Searching through the Maze

D$ has powerful search facilities for tracking down transactions, and a little familiarity with their use comes in handy. You can find all transactions in a certain range of dates, look up a group of checks by number, call up all tagged items in a group, and specify all transactions above or below a certain amount. These categories can also be combined, as in "search for Visa payment over $400 between June and November 1985." It's enough to make you look forward to being audited.

● Monogram on Top

D$* has to be the top icon on the desktop, or it will not work at all. To avoid hanging up the program before you even begin, always open the application from the desktop and, in the dialog box that appears, double-click to move *D$'s icon to the top before entering the program.

● Welcome to the Eighties

If you have a checking account that provides overdraft protection, create a Liability account for this item. You can then specify a repayment schedule and keep track of the exorbitant interest charges on overdrafts. Sophisticated users may find

(continues)

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this little wrinkle critical when they get into the MoneyLink electronic banking system.

Hey, Where's the Desktop?

Version 1.4 of *D$* comes with System version 3.1.1 and MiniFinder version 5.1 (there is no room for a Finder with the 3.1.1 System in this scheme). This leads some users to believe the System is damaged because it doesn't have a desktop. But it's not damaged, just crowded. When you use 800K disks, there is room for a Finder. Or better yet, use the 3.2 System with the 5.3 Finder.

Small-Scale Modeling

D$* is more than just a checkbook-balancing tool. Think of *D$ as a spreadsheet with the rows and columns already labeled in accordance with standard accounting conventions. Consider the example of a small retail business: you conclude from your traffic analysis that you can increase sales in your gift store 30 percent by hiring another salesperson to cover additional store hours. Using *Excel* or *Jazz,* you could construct a simple model to determine how much to pay the new employee. In *D$,* you can do the same type of analysis: increase the gross sales budget by 30 percent, and then set budgets for salary, withholding, expenses, utilities, cost of goods, and any other factors related to the new situation. The net annual budget balance then shows you the profit (or loss) that would result from the move. Playing "what if" by modifying salary and withholding, you can determine an optimum pay level.

Home, Sweet Home

Since the principal component of net worth for the typical *D$* user is a house, Monogram recommends creating an asset account that reflects the current market value of your house. And if you have faithfully followed the tutorial, you should also have these defined accounts: mortgage principal (liability), mortgage interest (expense), home insurance (expense), and property taxes (expense).

As your house increases in value, you'll have the satisfaction of seeing your net worth grow, on paper at least, as the house value (asset) soars past the mortgage principal (liability). □

Test drive the XP here:

AK. Anchorage: Pictures, Inc. 279-1515; Fairbanks: Empire Electronics. **AL**: Birmingham: AC3 Computing 942-9564; Village Computers 870-8943; Huntsville: AC3 881-6600; Montgomery: AC3 Computing 271-2211. **AZ**. Kingman: Computer Room 753-1711; Mesa: Computer Pro 820-5064; Compushare 898-0610; Phoenix: Computer Pro 942-9776; Computer Pro 263-6077; Compushare 943-2938; Compushare 285-0985; Compushare 953-1884; Scottsdale: Computer Pro 949-8833; Tempe: ComputerPro 829-7993. **CA**. 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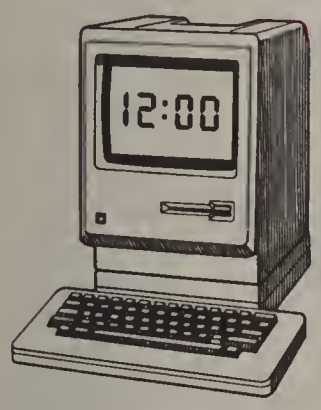

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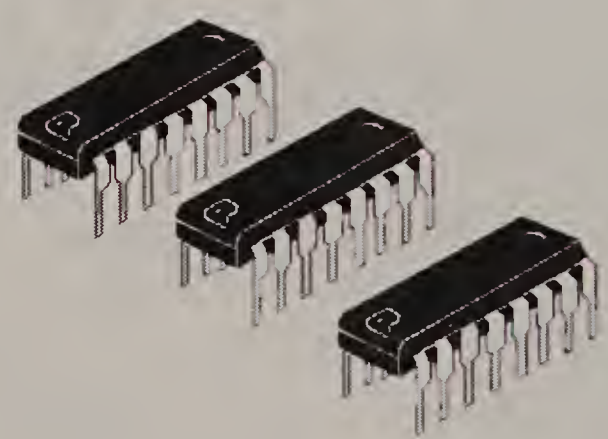

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Circle 395 on reader service card

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So, for a mere $295, you can watch as your data takes on all kinds of interesting and profitable new forms. Call 1 800 MACWARE today for the name of your nearest dealer.

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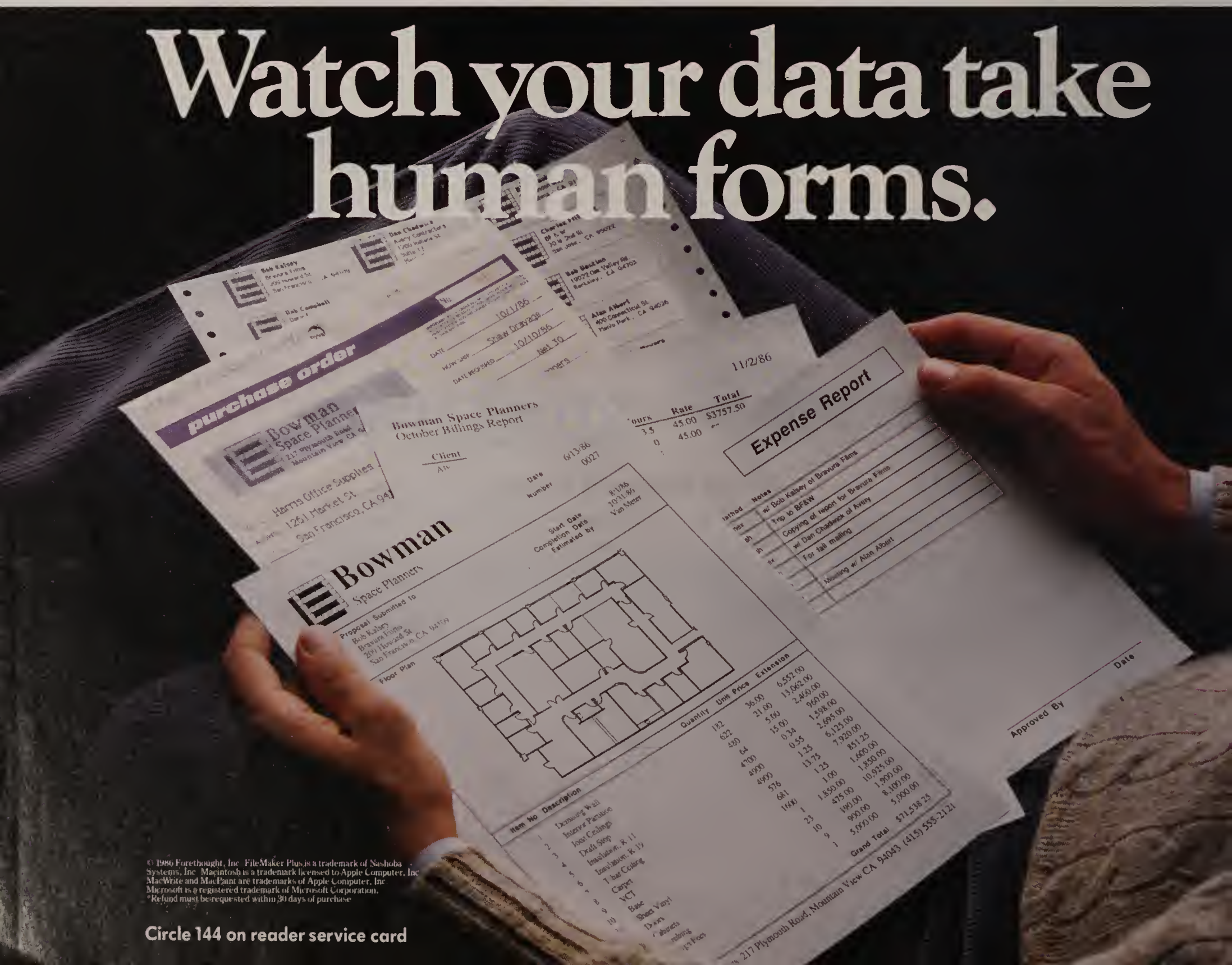

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Circle 144 on reader service card

Mac Business Tools

Two new time-billing programs for the professional

by Robert G. Leeds and Michael Miley

MEL LINDSTROM

The tracking and billing of time and expenses remain demanding tasks for many professionals. They must unearth numerous source documents from their files, analyze the contents, and generate a coherent bill that indicates the jobs and the services performed. Often, they must document the exact time spent on each activity, list the expenses incurred, total the charges for each, deduct payments, and compute any outstanding balances. Accordingly, there is an ongoing need for computer software capable of streamlining these labor-intensive tasks. But while database management and accounting software for the Macintosh continue to proliferate, effective time-billing programs do not come bundled with the typical database.

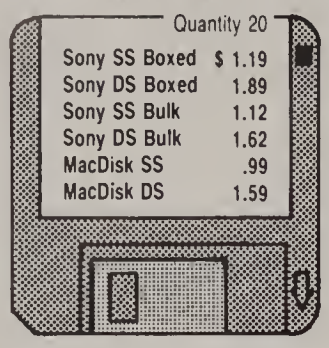
Fortunately, two new time-billing programs–*Rags to Riches Professional Billing (Pro Billing)* by Chang Laboratories and *Legal Billing* by Satori Software–are now available to make these tasks less time-consuming. With them you can track clients more accurately, develop billing categories, record source documents, and designate fee structures for specific services. Both programs are geared toward recording day-to-day activities and producing monthly statements, with posting systems that perform on-line updates. They differ in the way they process the client-to-task relationship, in their coding procedures, and in how they perform ancillary but important tasks such as generating management reports, exporting data to other programs, and permitting multiuser access.

Professional Billing

Pro Billing operates as a stand-alone program, but through the General Ledger module, it can merge with the other modules in the series (Inventory, Accounts Payable, and Accounts Receivable). *Pro*

(continues)

1-800-MAC-DISK



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Circle 459 on reader service card

Billing allows you to export data to other spreadsheets and databases, and it allows for serial access by multiple users within the same office. On a 512K Mac with an external drive, *Pro Billing* handles about 3000 clients.

Chinese Boxes

Pro Billing's four summary screens process clients, jobs, activities, or batches in a spreadsheetlike format. Double-clicking on an item unearths sublayers of source documentation and develops your books. To get started, however, you set up your files through windows activated by pull-down Enter menus. You have the option of entering each file into one of nine subclasses that you define to help structure your reports. Beginners are aided by an on-screen tutorial and by Chang's context-sensitive help screens, which immediately default to a short how-to on a particular task.

You enter all transactions through a Data window. Chang recommends that you post bills by batching your source documents (for example, telephone bills for the month go in one batch, and time sheets for one person go in another) as you would in manual systems. *Pro Billing*'s structure of interlocking screens works much like a relational database—you can activate archived information as you input new data (see Figure 1). A summary of all jobs appears when you double-click on a job field. Click on the job you want, and it appears again in its own place on the data card.

Notes and Times

The program has a Notes window, an important feature because lengthy descriptions of services rendered are often not given the necessary space in databases. After you begin entering data, but before you post it, click on the Notes button. A blank Notes window appears, in which you can enter up to 1000 characters of descriptive text. Posting the description and then the entire data card is somewhat tricky, however. If you post the first screen before the description, your notes don't appear with the appropriate data when you print your bill, and the text may be lost. Furthermore, the memo box appears to allow for some 40 characters, but in our tests, the note truncated to around 25.

Pro Billing allows you to bill in real

(continues)

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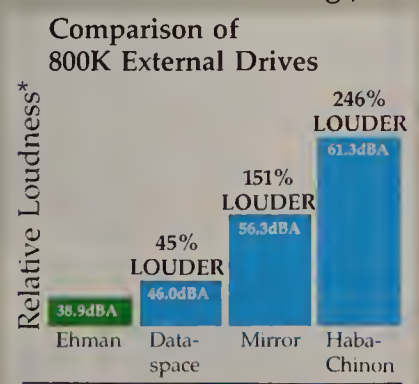

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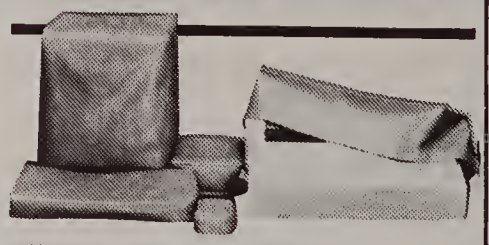

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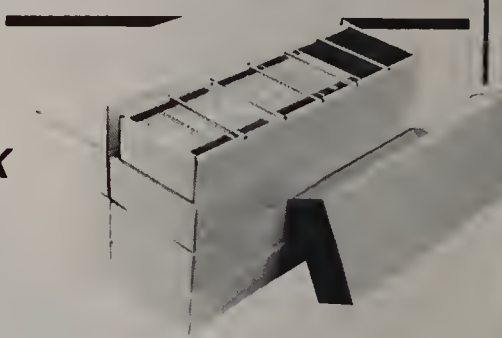

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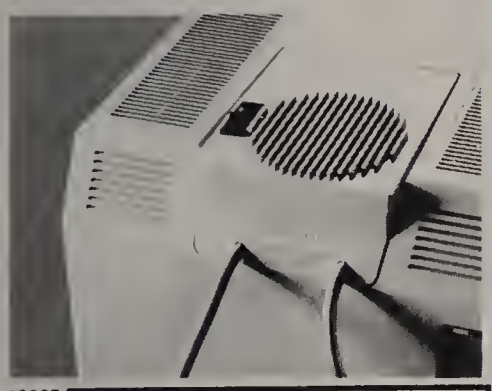

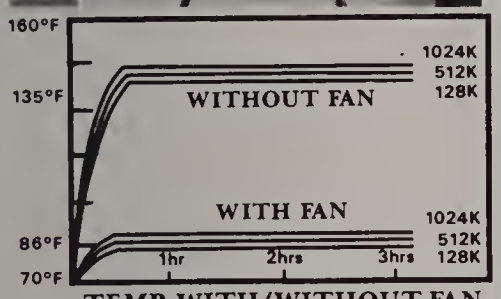

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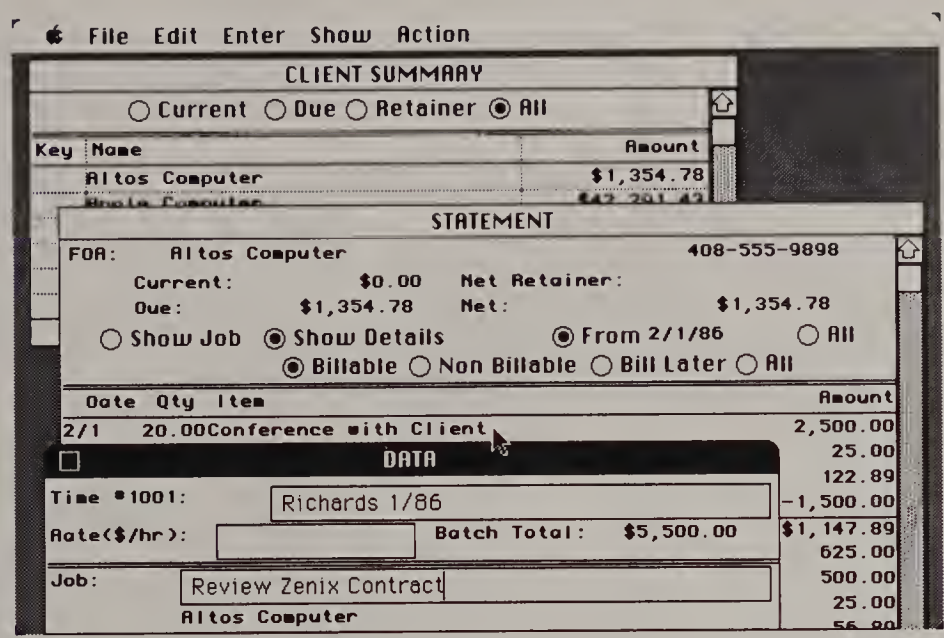

Figure 1
Pro Billing's *Client Summary, Statement, and Data Entry screens—an example of how the program layers and activates your data. Here, "Altos Computer" and "Conference with Client" have been clicked to unearth the specific source document "Review Zenix Contract."*

time as well as in batches, with a stopwatch feature that clicks on when you begin a task, pauses during interruptions, and clicks off when you've finished. Your time and expense charges are automatically recorded and calculated, which helps management review productivity by monitoring the time expended by employees in rendering services.

A House with 12 Doors

Pro Billing provides 12 basic report formats (plus several variations) you can print in full or partial detail (see Figure 2). Since the program screens open up like boxes within boxes, you can zoom in and out of your database—viewing, modifying, and printing lists, end-of-period statements, and productivity-analysis worksheets. In trial drafts, however, we found that lengthy column headings were truncated when we used the ImageWriter, though not when we used the LaserWriter. Also, be cautious when printing end-of-period reports. *Pro Billing* allows you to print an unlimited number of trial statements, but when you print the final statement, all time slips get posted to the sys-

(continues)

Weare, Figenbaum & Richards
1000 University Avenue
Palo Alto, CA 94305
Attn: Accounts Receivable

Aug 4, 1986

Altos Computer
2000 Milpitas Drive
Milpitas, CA 95123
Attn: Accounts Payable

Thank you for your business

Review Zenix Contract $1,147.89

	Professional Services	Hours	Amount
2/1	Conference with Client	20.00	$2,500.00

	Disbursements	Quantity	Amount
	Courier Services		$25.00
	Long Distance Phone		$122.89
			$147.89

	Payments/Retainers		Amount
2/1	Payment-Thank You		$1,500.00

Review Stock Sale $206.89

	Professional Services	Hours	Amount
2/1	Telephone Conversation	5.00	$625.00
2/1	Drafting & Revising Letter	5.00	$500.00
		10.00	$1,125.00

	Disbursements	Quantity	Amount
	Courier Services		$25.00
	Long Distance Phone		$56.89
			$81.89

	Payments/Retainers		Amount
2/1	Payment-Thank You		$1,000.00

Figure 2
A Pro Billing *report. The statement indicates the specific activity performed, the hours billed, and the computed amount due. Payments received can be indicated also.*

tem, and you cannot print any other bills for that client. Accordingly, Chang recommends backing up your disks before closing out a period.

All in Good Time

Overall, *Rags to Riches Professional Billing* is a very good program. The documentation explains why you should adopt certain practices, and an appendix outlines the basics of accounting. The program's interactive screens and its Chinese-box approach to data manipulation give you constant summaries of all clients, jobs, and activities, and by stressing the batching approach, *Pro Billing* forces you to be aware of the status of all your files. But if you activate too many screens at once, it's easy to get lost in the clutter. And while Chang Labs has done a decent job of translating the time-billing process to the Mac interface (so that entry becomes a process of clicking on features with a minimum of typing), there's one minor flaw: the scroll bar arrows do not scroll through a statement but take you through line by line.

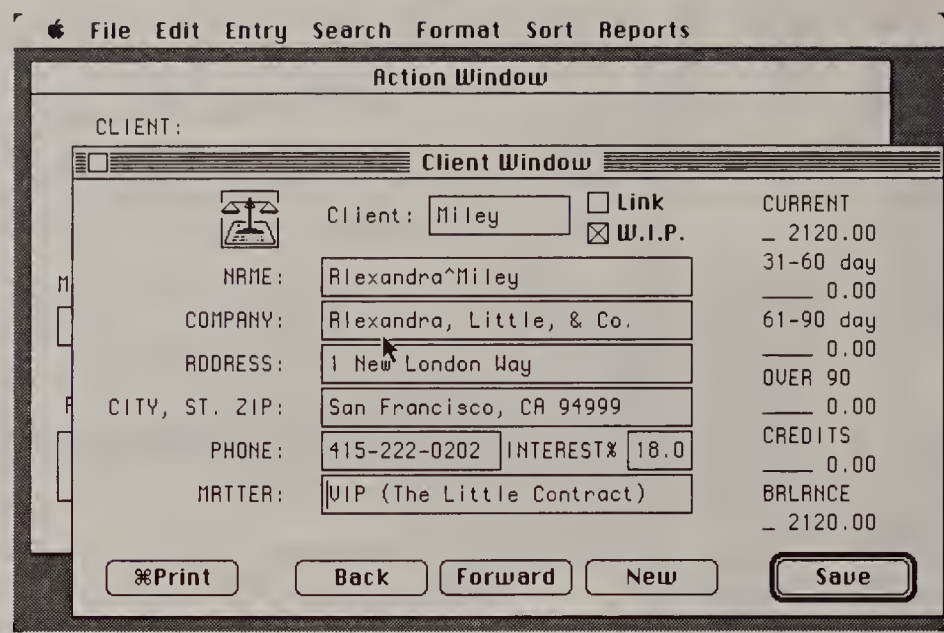

Figure 3
Legal Billing's *entry screens allow you to batch client information by linking or to designate a matter as work-in-progress. Here, W.I.P. has been checked; this slip will not be deleted with the end-of-month posting.*

Legal Billing

Legal Billing opens with two simple windows. During everyday operations, these are the only two screens displayed (see Figure 3). All you need to do is enter your client information in the Client window and post it. Then, switching to the Action window, you specify which service was performed for that particular client. That part is easy, which might account for the program's lack of on-line help.

Code Blue

With a 512K Mac and two disk drives, *Legal Billing* handles about 600 clients. Since it uses alphanumeric client codes (and numeric codes for employees and actions), you must set up your database carefully. The first entry should be simply your

(continues)

"This is what I think a database on the Mac should be." John C. Dvorak, *InfoWorld*, May 26, 1986

***Very* easy to use**

"I mastered the program in one sitting."
User Ted Roeser, Dickinson, TX

"Record Holder is easy to use . . . The manual and tutorial are top notch."
MACazine, May, 1986

Powerful, too

". . . It's a powerful data manager."
MacUser, April, 1986

"This program out-classes most other programs selling for three or four times as much."
The Desktop Journal, a publication of the Yale Macintosh user group, Winter, 1986

"Record Holder met all our performance expectations . . ."
InfoWorld, March 24, 1986

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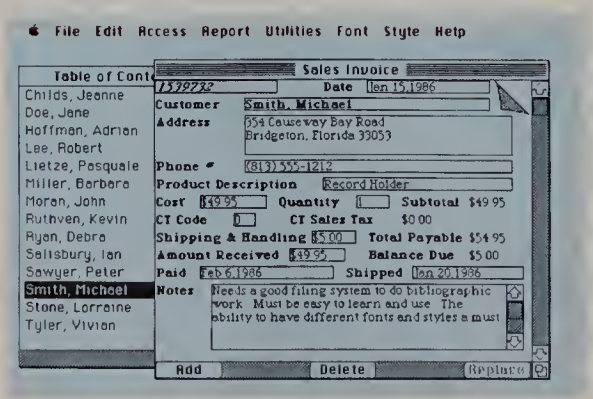

A typical Record Holder screen, showing the easy-to-format Display window and the Unique Table of Contents window, which allows instant access to all records in your file.

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Ferrari Grand Prix runs on Macintosh 512 and Plus, Fokker Triplane runs on Macintosh 128, 512 and Plus

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Circle 594 on reader service card

client's name. You can give any subsequent and related matters a numeric suffix. Since *Legal Billing* defaults to an ascending sort, a single entry for one client will wind up adjacent to other matters related to the same client.

But a problem arises when you want to assign an action to a specific employee or associate: you have to remember the respective numbers. Satori partially alleviates the problem of client codes by providing a scroll box that contains them. But actions and employees have numbers too, and you may find yourself switching back and forth between the entry windows and the lists of codes—a chore that's harder than it sounds. There are five pages of action codes: 4 codes for credits, 5 for disbursements, 36 for services, and 2 for adjusting client bills. In addition, on a three-page list of employee codes, 27 are numbered slots allotted to your employees.

Enter the Client

After setting up your employee and action lists, together with their codes, you may enter data in the Client window. Satori has simplified the process of entering clients and matters by combining them on the same entry screen. When posting your actions in the Action window, however, you'll discover that there's only space for 80 characters of remarks. Satori solves this by patching the original program. Just keep typing, and the program automatically enters text in additional 80-character units—an awkward solution, since the whole note is not visible at one time.

Furthermore, since many features found in *Legal Billing* are encoded and activated solely by means of their number codes, there's a tendency for your data slips to get buried. To find a batch of slips, you must hunt by pulling down the Search menu and narrowing your choices by defining the range of search criteria: actions, dates, clients, and employee numbers.

Toggling Reports

Because *Legal Billing* does not have a spreadsheetlike format, you'll want to paste your statements into a word processor for on-screen viewing or print them frequently for an overview of your data-

(continues)

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7/28/86	Draft Pleadings: Case formulated and initial drafts drawn up concerning Little Contract	6.00	240.00
	Michael Francis...	6.00	240.00
7/31/86	Bankruptcy: Chapter 11 filed on behalf of client's benefactors.		500.00
	Thomas Patrick...	0.00	500.00
7/24/86	Conference With: Conference with client included proposal struck in new language.	6.00	30.00
	Helena Eliopolis...	6.00	30.00
7/26/86	Travel Time: Travel between Army Street location and secondary offices	20.00	80.00
	Robert Rowntree...	20.00	80.00
7/29/96	Interviewing Witnesses: Witnesses interviewed at Mt. Tamalpais; extensive disquisitions given.	30.00	30.00
	Caroline Richardson...	30.00	30.00
7/29/86	Misc. Client Advance: Advance for initial expenses; additional moneys pending.		1000.00

Total Time: 62.00 hrs.

Services this Period: $ 880.00
Disbursements: $ 1000.00

AMOUNT NOW DUE: $ 0.00

Figure 4
This statement utilizes Legal Billing's *memo field to give added information on the specific services performed. Employees performing the services are listed. Amount due is 0.00 because this is still the first month.*

base. You can print an alphabetized client listing, aging reports, employee time reports, and end-of-month statements (see Figure 4). But while *Legal Billing* seems to offer an almost unlimited number of powerful sorting and report-generating combinations, they are only available one by one. You pull down menus and toggle the options on or off, choosing to sort, for example, by date, credits, disbursements, time columns, amounts, or employee subtotals on the statements.

In *Pro Billing* Chang divides the posting of slips into monthly, quarterly, and year-to-date updates. The system retains transactions with the first update and deletes them with the latter two. In *Legal Billing,* however, closing the month and printing the final statement clear out the time slips and post the transactions. You have a 10-second countdown during which to abort the process before your time slips self-destruct.

Illegal Measures?

There are some shortcomings with the way Satori has developed its program for lawyers. No single fee can be more than $10,000. It's difficult to edit multiple time slips simultaneously. The Write-Up/Write-Down actions do not print on the client bill, so the sum of individual dollar amounts for activities doesn't match the adjusted total on your statements. The numeric coding scheme buries data and encourages you to print hard copies for reference whenever you make changes. The program's documentation is sometimes vague and repetitive. And finally, since you post your slips monthly, you don't get a cumulative on-screen picture of your running totals (though a companion product by Satori, *Project Billing,* does permit this).

Keeping Time

Unfortunately, both programs lack a feature that would maximize their usefulness and accountability in the time-billing process. Neither allows you to enter a calendar of significant dates to plan projects and monitor their progress. What both programs do—with differing ability—is let you form a picture, from various reports, of past transactions; from these you extrapolate for budgeting and projections. In deciding which program is best for you, you'll need to consider how much you want to do on screen and how much in hard copy. After all, no time-billing program should spend its time reinventing the paper chase. ☐

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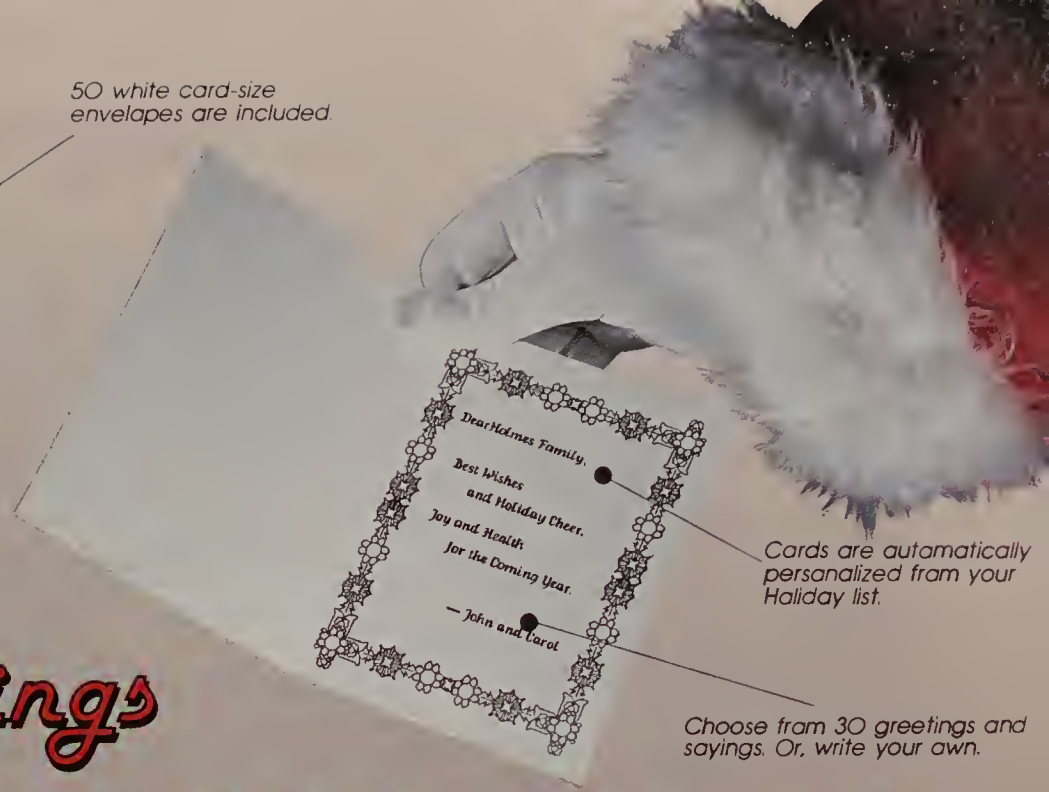

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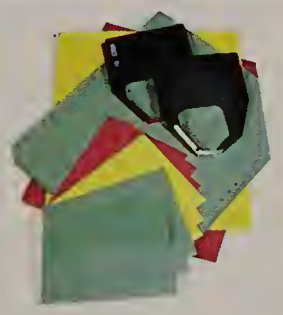

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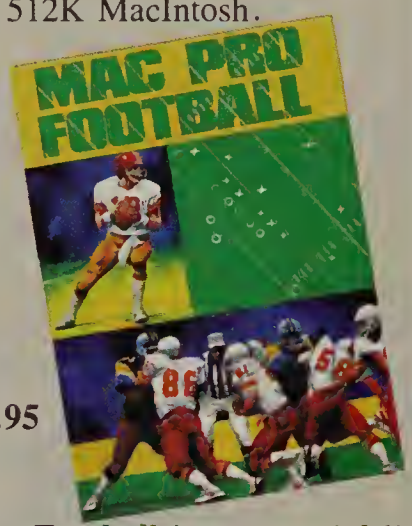

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Updates

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

Bulk Mailer version 2.1 handles up to 8600 records and adds eight features, including a command that merges two linked lists, a way to include titles on mail-merge documents, and more flexibility in searching. Satori Software, 2815 Second Ave. #590, Seattle, WA 98121, 206/443-0765. $10; $125 new.

Easy3D version 1.01 speeds up some functions but offers no new features. Enabling Technologies, 600 S. Dearborn #1304, Chicago, IL 60605, 312/427-0408. Free; $149 new.

LaserWorks version 1.2 corrects bugs, improves the user interface, and adds new features, such as the ability to zoom in for a close-up view, a keyboard command for repeated scaling, and a way to create horizontal, vertical, and 45-degree lines easily. EDO Communication, 63 Arnold Way, West Hartford, CT 06119, 203/233-5850. $25; $299 new.

Liberty Spell II version 1.2 is an enhancement of *Liberty Spell Checker* featuring a larger (30,000-word) dictionary, a resizable dictionary window you can move, space for a specialized dictionary, the ability to use a program's search-and-replace functions to insert corrections, and a new manual. The new program works with *MacPaint, MacDraw, Excel, Jazz,* and other programs. DataPak Software, 14011 Ventura Blvd. #507, Sherman Oaks, CA 91423, 818/905-6419. $20; $79.99 new.

MacGAS version 2.0 checks spelling in documents interactively or by batch; specialized dictionaries can be loaded at will, and entries in those dictionaries can be removed easily. EnterSet, 410 Townsend, San Francisco, CA 94107, 415/543-7644. $15; $99 new.

MDC II version 2.1C works with both HFS and MFS and improves printing options. New Canaan MicroCode, 136 Beech Rd., New Canaan, CT 06840, 203/966-6969. $5; $15 to upgrade from the original MDC; $49.95 new.

StatWorks version 1.2 is not copy protected, is LaserWriter compatible, and has improved color settings for the ImageWriter II. It also reads ASCII text files and SYLK files, has new significance routines, greater accuracy in some routines, and adjusted R2 values in regressions. Cricket Software, 3508 Market St. #206, Philadelphia, PA 19104, 215/387-7955. Free; $125 new. □

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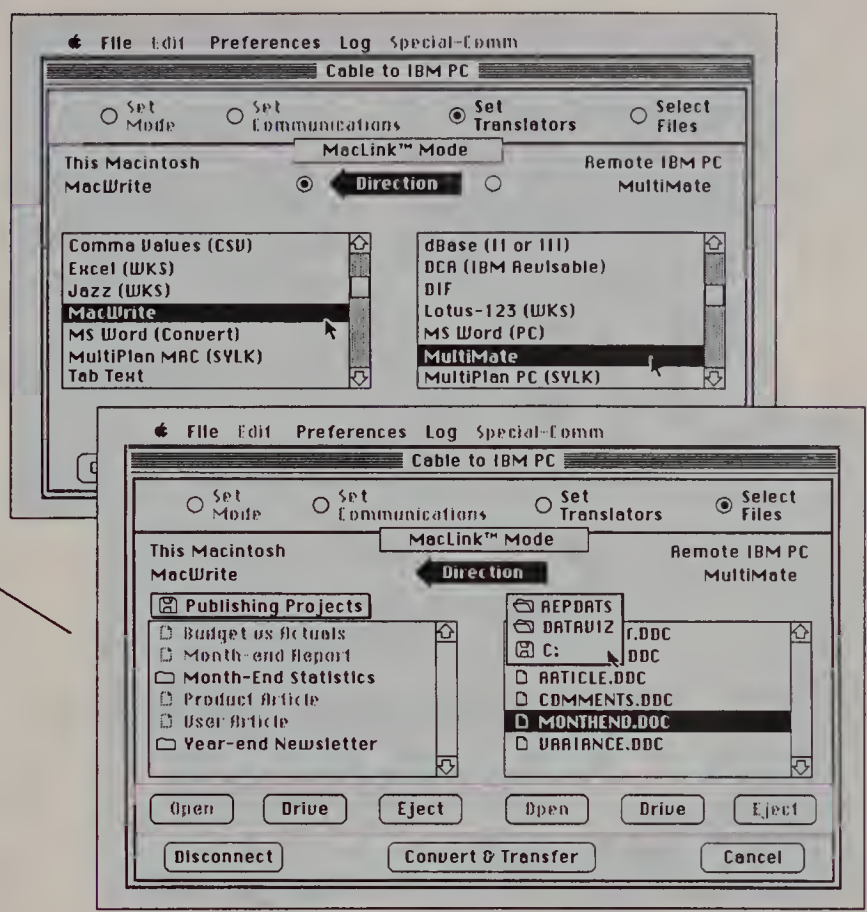

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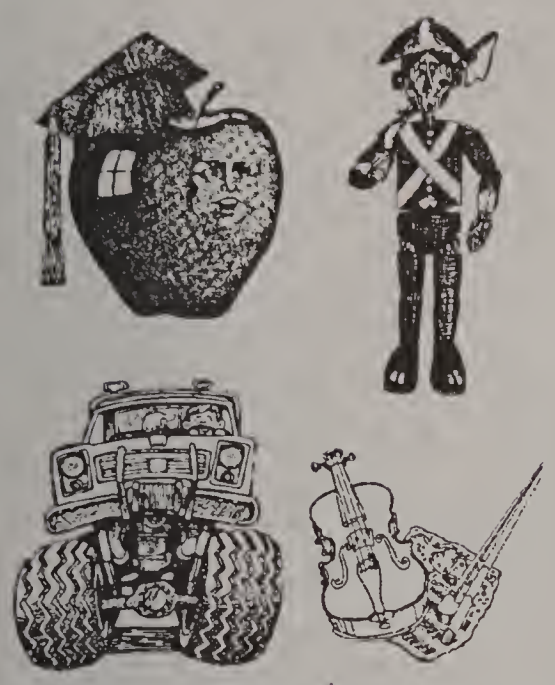

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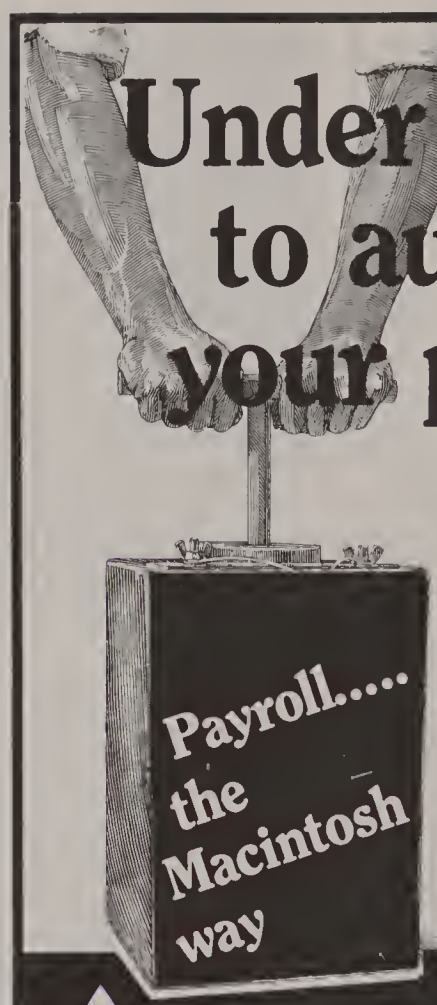

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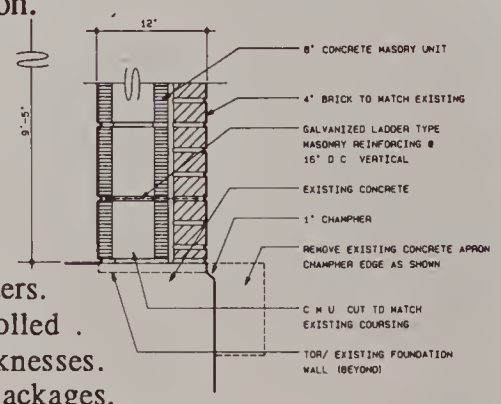

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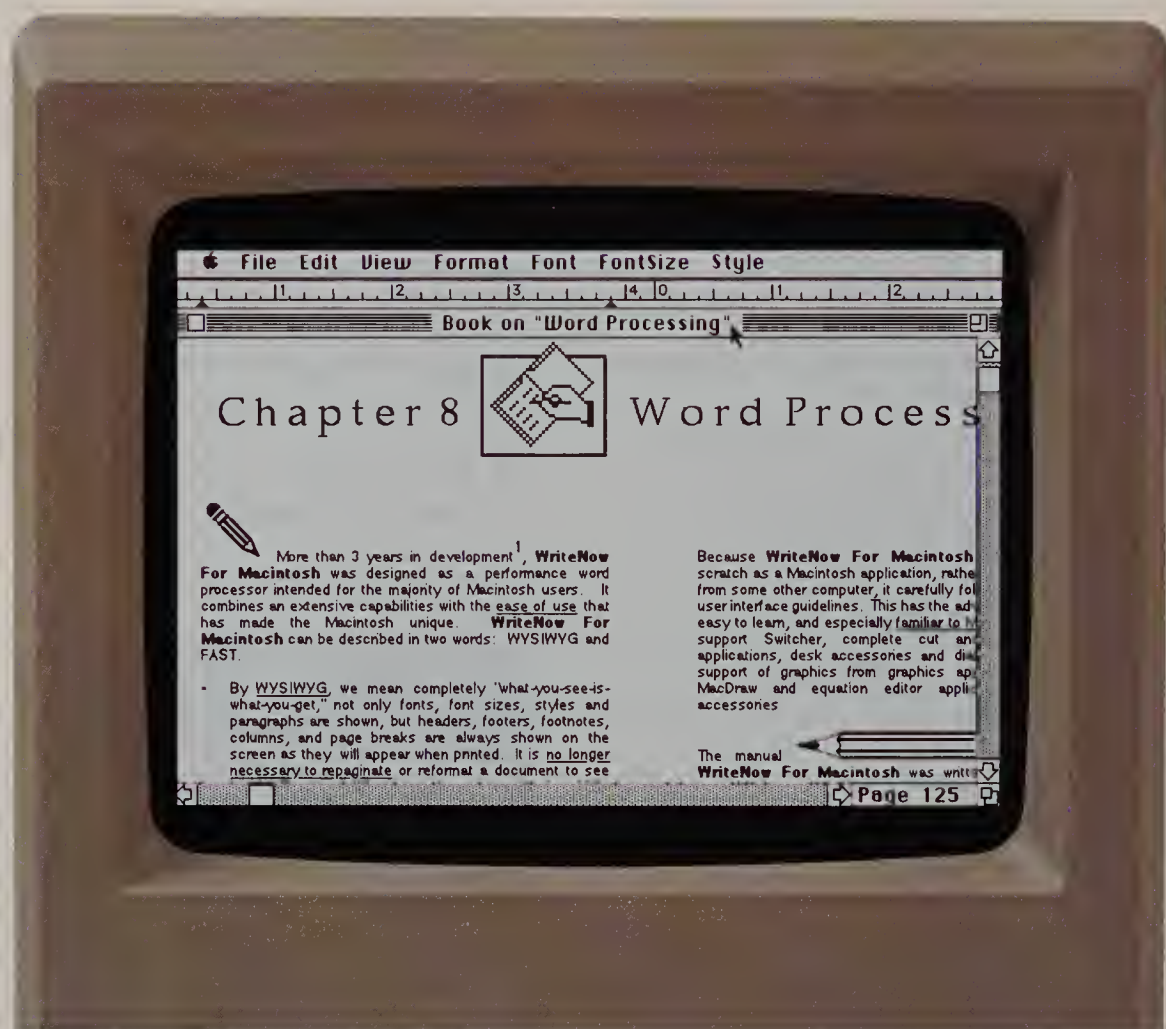

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Version 5.25. Abaton Technology Corporation, 7901 Stoneridge Dr.´#500, Pleasanton, CA 94566, 415/463-8822. 128K minimum memory. $695.

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Version 1.1. Symmetry Corporation, 761 E. University Dr., Mesa, AZ 85203, 602/844-2199, 800/624-2485. 128K minimum memory, 512K recommended (cannot be used as a desk accessory with a 128K Mac). $59.95.

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By Kim Schuette, 1984, Arrays Publishing, 6711 Valjean Ave., Van Nuys, CA 91406, 818/994-1899, $19.95.

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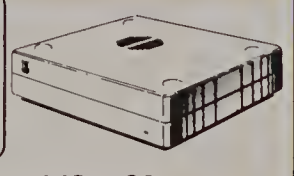
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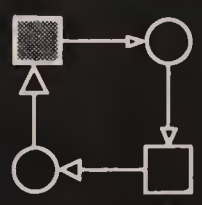

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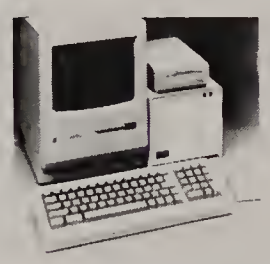

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Magnetic Arts
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MathStatLib
Clear Lake Research, Inc., 5615 Morningside #127, Houston, TX 77005, 713/523-7842, 800/835-2246 ext. 199 (orders). Requires Microsoft BASIC 2.0 or greater.*

McPic!
Volume 1 and Volume 2. Magnum Software, 21115 Devonshire St. #337, Chatsworth, CA 91311, 818/700-0510. 128K minimum memory. $49.95 each.*

Megaroids
Public domain. Available from on-line services and through user groups.

MegaTrack
Version 2.2. Musicworks, 18 Haviland, Boston, MA 02115, 617/266-2886. Key-disk copy protection; installs on hard disk. 128K minimum memory; requires MIDI; 512K plus external drive or Mac Plus recommended. $79. Also available bundled with MIDI, nine music applications, and cables as Professional Musician System for $549.

Microsoft Excel
Version 1.0. Microsoft Corporation, 16011 N.E. 36th Way, Box 97017, Redmond, WA, 98073-9717, 206/882-8080, 800/426-9400. Key-disk copy protection; installs on hard disk. 512K minimum memory; requires 800K drive. $395.

Microsoft Flight Simulator
Version 1.0. Microsoft Corporation, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 206/882-8080, 800/426-9400. Key-disk copy protection. 128K minimum memory; 512K recommended. $49.95.*

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Microsoft Word
Version 3.0 (prerelease). Microsoft Corporation, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 206/882-8080, 800/426-9400. 512K minimum memory. $195 version 1.05; price to be announced for version 3.0.

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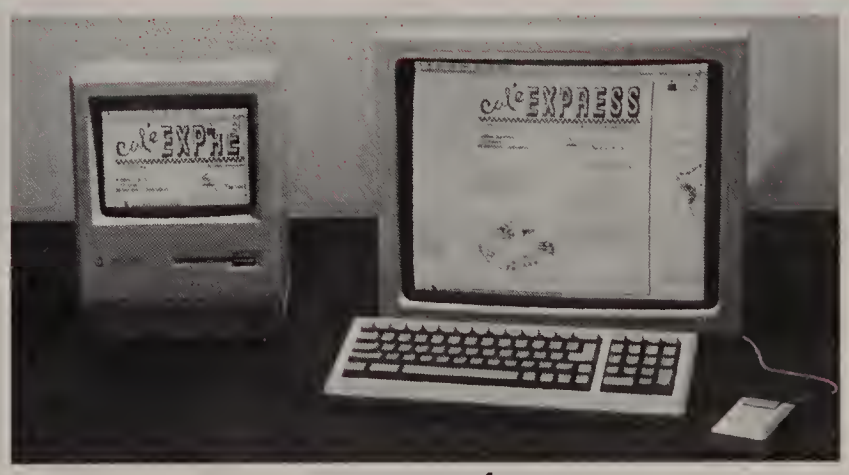

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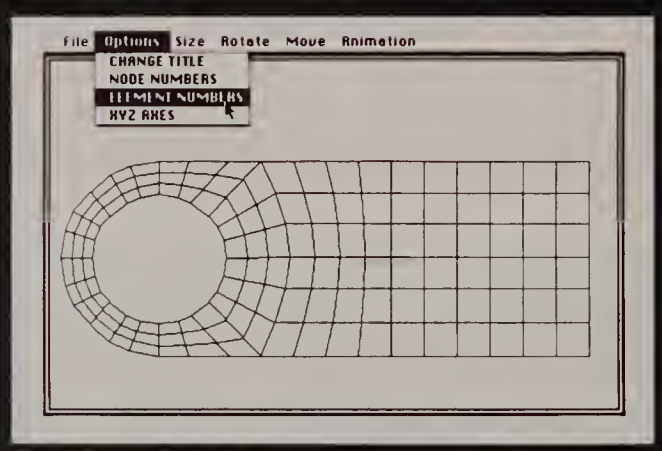

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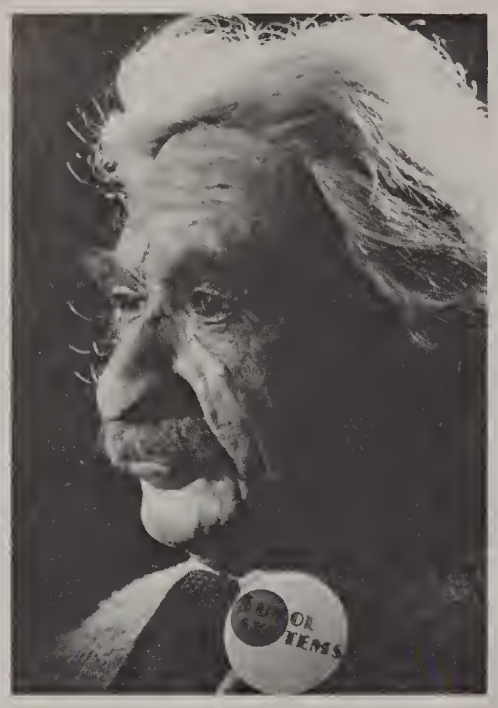

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The Recursive Universe
By William Poundstone, 1984, William Morrow, 105 Madison Ave., New York, NY 10016, 212/889-3050. $15.95.

Sargon III
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Volume 1. Decision Science Software, P.O. Box 1483, Sugar Land, TX 77487, 713/491-0073. 128K minimum memory. $35.*

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SpeechLib
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SPEED>S Electronic Delivery
SPEED>S Corporation, 430 First Ave. N, Minneapolis, MN 55401, 612/341-0920. 512K memory; requires 1200-bps or 2400-bps modem. $80, $50 each for two or more packages.

StatView 512+
Versions 1.0 and 1.1. BrainPower, Inc., 24009 Ventura Blvd. #250, Calabasas, CA 91302, 818/884-6911. Requires two drives; 512K or Mac Plus recommended.

Structure and Interpretation of Computer Programs
By Harold Abelson and Gerald J. Sussman, 1984, MIT Press, 28 Carleton St., Cambridge, MA 02142, 617/253-2884. $37.50.

Studio Session
Version 1.2. Bogas Software/MacNifty Central, 6860 Shingle Creek Pkwy. #110, Minneapolis, MN 55430, 612/566-0221, 800/328-0184. Key-disk copy protection. 512K minimum memory; two drives recommended. $89.95.

SunShine Graphics Library
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The Toy Shop
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Pascal and Modula-2 source code are nearly identical. Modula-2 should be thought of as an enhanced superset of Pascal. Professor Niklaus Wirth (the creator of Pascal) designed Modula-2 to replace Pascal.

Added features of Modula-2 not found in Pascal

- CASE has an ELSE and may contain subranges
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- Programmer definable scope of objects
- Open array parameters (VAR r: ARRAY OF REALS;)
- Elegant type transfer functions

Mac Plus Benchmarks (secs)	Compile	Link	Execute	Optomized Size
Sieve of Eratosthenes:	7.3	5.8	5.1	1257 bytes
Float	8.0	8.6	10.3	3944 bytes
Calc	6.8	5.7	4.3	1736 bytes
Null program	5.7	5.6	—	1100 bytes

```
MODULE  Sieve;
CONST   Size = 8190;
TYPE    FlagRange = [0..Size];
        FlagSet = SET OF FlagRange;
VAR     Flags: FlagSet,
        i:     FlagRange;
        Prime, k, Count, Iter: CARDINAL,
BEGIN   (*$S-,$R-,$A+*)
  FOR Iter:= 1 TO 10 DO
    Count:= 0;
    Flags:= FlagSet(); (* empty set *)
    FOR i:= 0 TO Size DO
      IF (i IN Flags) THEN
        Prime:= (i * 2) + 3; k:= i + Prime;
        WHILE k <= Size DO
          INCL (Flags, k);
          k:= k + Prime;
        END;
        Count:= Count + 1.
      END,
    END;
  END;
END Sieve.
```

```
MODULE Float;
FROM MathLib0 IMPORT sin, ln, exp,
                     sqrt, arctan;
VAR x,y: REAL; i: CARDINAL;
BEGIN (*$T-,$A-,$S-*)
  x:= 1.0;
  FOR i:= 1 TO 1000 DO
    y:= sin (x); y:= ln (x); y:= exp (x);
    y:= sqrt (x); y:= arctan (x);
    x:= x + 0.01;
  END;
END float.
```

```
MODULE calc;
VAR a,b,c; REAL; n, i: CARDINAL;
BEGIN (*$T-,$A-,$S-*)
  n:= 5000;
  a:= 2.71828; b:= 3.14159; c:= 1.0;
  FOR i:= I TO n DO
    c:= c*a, c:= c*b; c:= c/a; c:= c/b;
  END,
END calc.
```

Product History

The TDI Modula-2 compiler has been running on the Pinnacle supermicro (Aug. '84), Atari ST (Aug '85), Amiga (Jan. '86) and will soon appear on UNIX in the 4th Qtr. '86.

Regular Version $89.95 Developer's Version $149.95 Commercial Version $299.95

The regular version contains all the features listed above. The developer's version contains additional Mac modules, macros and demonstration programs – a symbol file decoder – link and load file disassemblers – a source file cross referencer – the kermit file transfer utility – a Modula-2 CLI The commercial version contains all of the Mac module source files

Other Modula-2 Products

Kermit	– Contains full source plus $15 connect time to Compuserve.	$29.95
Examples	– Many of the programs from Inside Macintosh translated into Modula-2.	$24.95
GRID	– Sophisticated multi-key file access method with over 30 procedures to access variable length records.	$49.95

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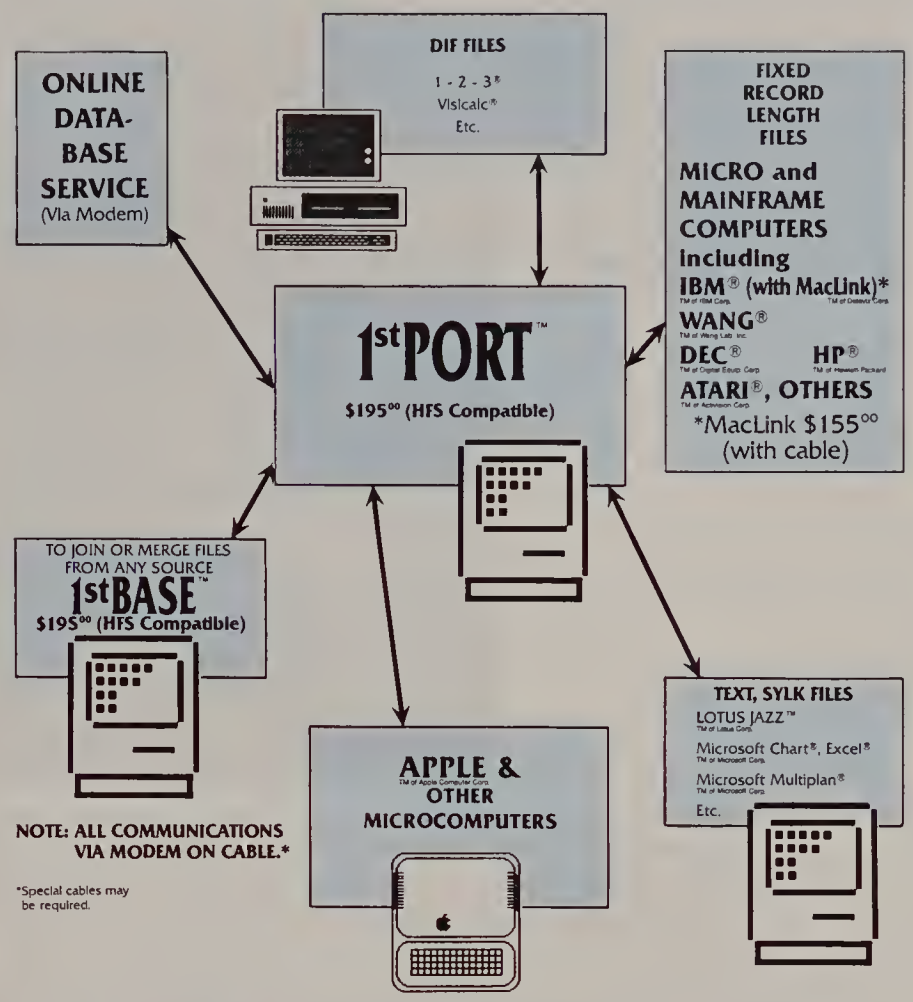

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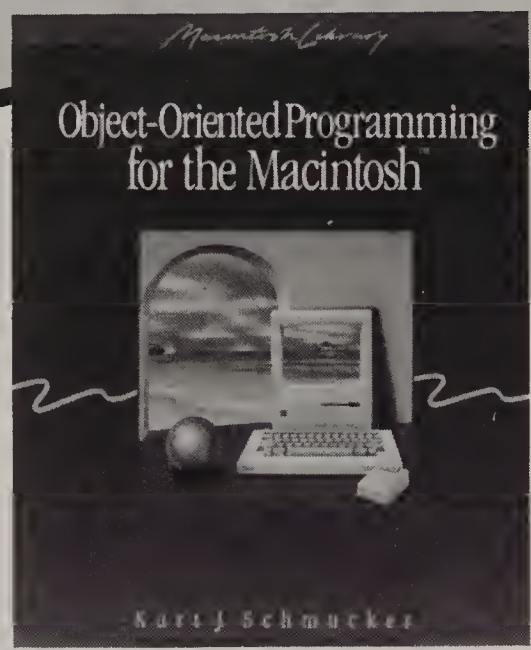

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September 11 version. Centram Systems West, Inc., 2560 Ninth St. #220, Berkeley, CA 94710, 415/549-5900. 512K minimum memory; requires AppleTalk and at least one hard disk. $149 per Mac, $389 per IBM PC.

Ultra-Office
Version 3.2. Lutzky-Baird Associates, 5601 Slauson Ave. #222, Culver City, CA 90230, 213/649-3570. 512K minimum memory (can be used on a 128K Mac but with limited features); AppleTalk network. $795-$7500.

Voila!
Version 1.0. Tangent Software, Inc., 14206 S.W. 136th St., Miami, FL 33186, 305/252-0892, 800/622-5483. 512K minimum memory. $99.95.

Winter Games
Epyx, Inc., P.O. Box 8020, 600 Galveston Dr., Redwood City, CA 94063, 415/366-0606. Not copyable.*

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Version 1.3. Advanced Logic Systems, 1283 Reamwood Ave., Sunnyvale, CA 94089, 408/747-1988. 512K minimum memory; two drives recommended. $79.95.

WriteNow for Macintosh
Version 1.0. T/Maker Company, 1973 Landings Dr., Mountain View, CA 94043, 415/962-0195. 128K minimum memory. $175.

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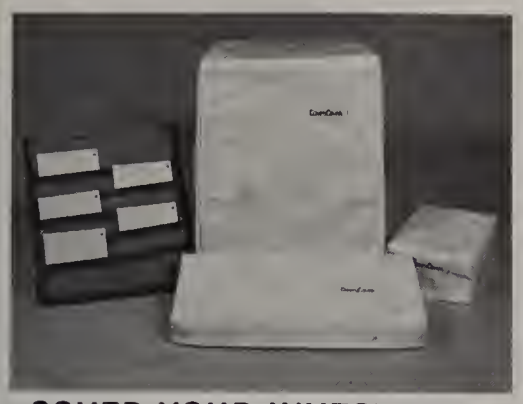

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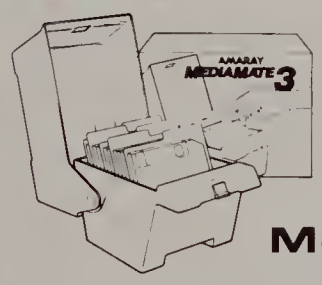

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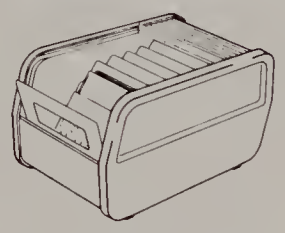

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Months on chart	Last month	This month	
18	1	1	**Microsoft Word** *Microsoft*
10	2	2	**Microsoft Excel** *Microsoft*
6	5	3	**PageMaker** *Aldus*
2*	4	4	**MacWrite** *Apple Computer*
15	6	5	**MacDraw** *Apple Computer*
2*	3	6	**MacPaint** *Apple Computer*
1	–	7	**FullPaint** *Ann Arbor Softworks*
3	9	8	**MacDraft** *Innovative Data Design*
12	–	9	**Jazz** *Lotus Development*
17	7	10	**Microsoft File** *Microsoft*

Education Software

Months on chart	Last month	This month	
2	1	1	**Math Blaster!** *Davidson and Associates*
2	4	2	**Typing Tutor III** *Simon and Schuster Computer Software*
2	3	3	**MasterType** *Scarborough Systems*
2	2	4	**MacEdge II** *Think Educational Software*
2	5	5	**Kids' Time** *Great Wave Software*

Entertainment Software

Months on chart	Last month	This month	
2	1	1	**Flight Simulator** *Microsoft*
2	2	2	**MacGolf** *Practical Computer Applications*
1	–	3	**Airborne!** *Silicon Beach Software*
1	–	4	**Sargon III** *Spinnaker-Hayden*
1	–	5	**Gato** *Spectrum HoloByte*

Networking/Data Communications

Months on chart	Last month	This month	
2	1	1	**AppleTalk** *Apple Computer*
2	3	2	**MacServe** *Infosphere*
2	5	3	**Apple Personal Modem** *Apple Computer*
10	2	4	**MacTerminal** *Apple Computer*
2	4	5	**Smartcom II** *Hayes Microcomputer Products*

Hard Disk Drives

Months on chart	Last month	This month	
2	1	1	**Apple Hard Disk 20** *Apple Computer*
2	5	2	**HyperDrive 20** *General Computer*
2	3	3	**DataFrame 20** *SuperMac Technology*
2	2	4	**LoDown-20** *LoDown*
1	–	5	**HD-20** *MDIdeas*

Books

Months on chart	Last month	This month	
2	1	1	**Excel in Business** *Douglas Cobb, Microsoft Press*
2	2	2	**Inside Macintosh** *Addison-Wesley*
2	–	3	**The Apple Macintosh Book** *Cary Lu, Microsoft Press*
2	3	4	**The Printed Word** *David A. Kater and Richard L. Kater, Microsoft Press*
2	5	5	**Microsoft Macinations** *Mitchell Waite, Robert Lafore, and Ira Lansing, Microsoft Press*

Product Watch

Editors' choice:
Other recent products of particular interest.

Market Pro *Pro Plus* stock market analysis

Phoenix 3D *Dreams of the Phoenix* 3-D graphics

Solo (formerly SPUD) *MacAmerica* page layout

Source: Exclusive InfoCorp survey of more than one hundred Macintosh retailers and selected mail-order suppliers.

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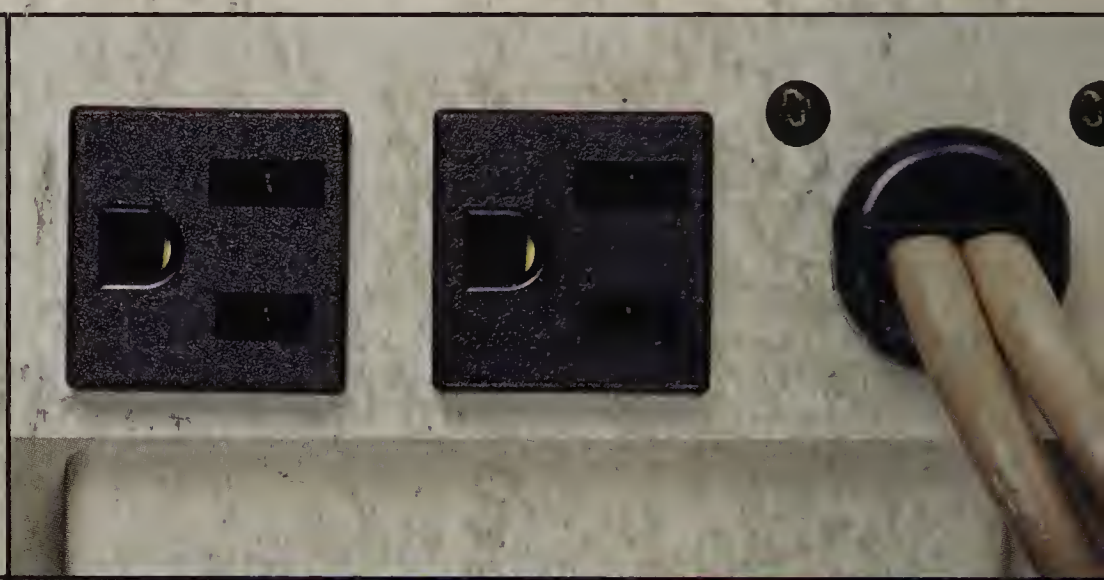

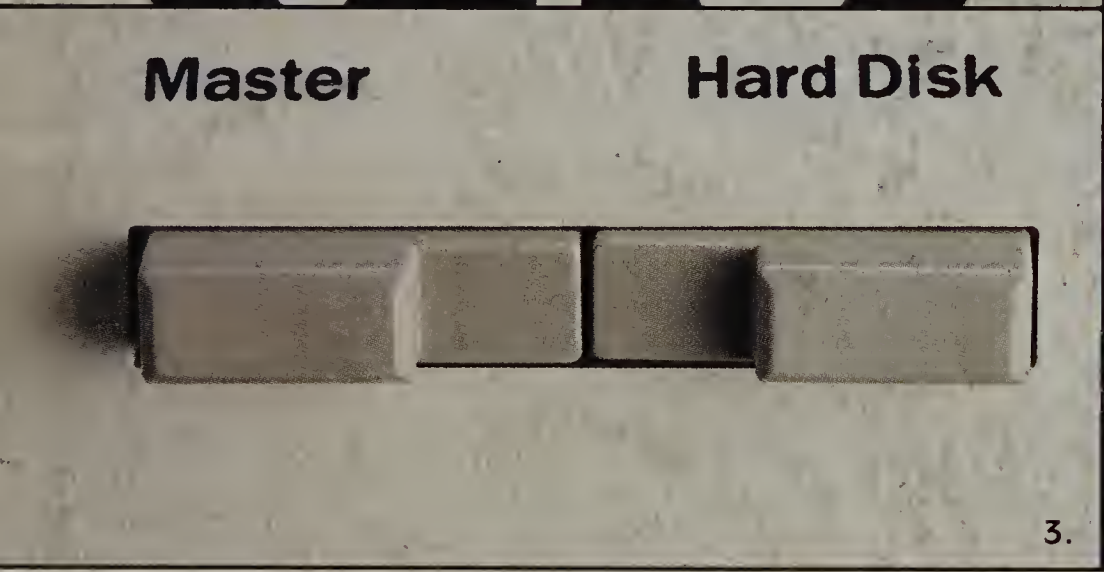

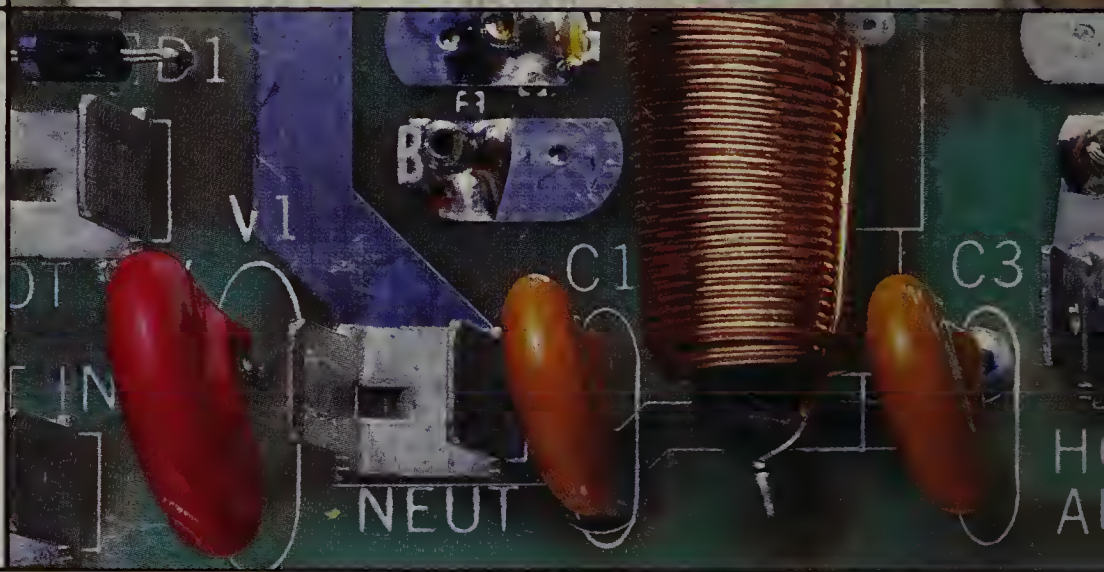

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